MARCH/APRIL '88
Vol. 4 No. 3
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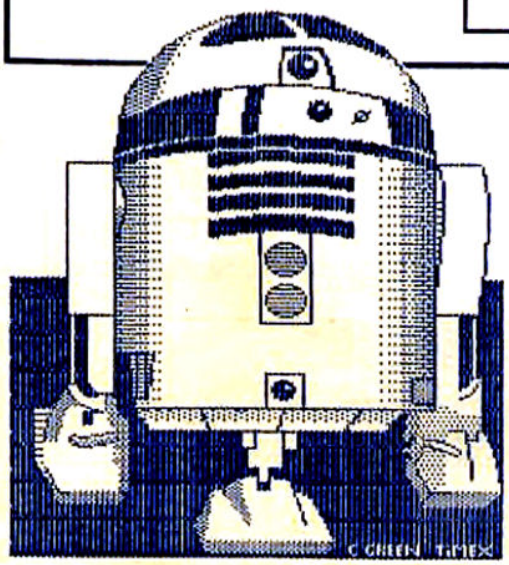
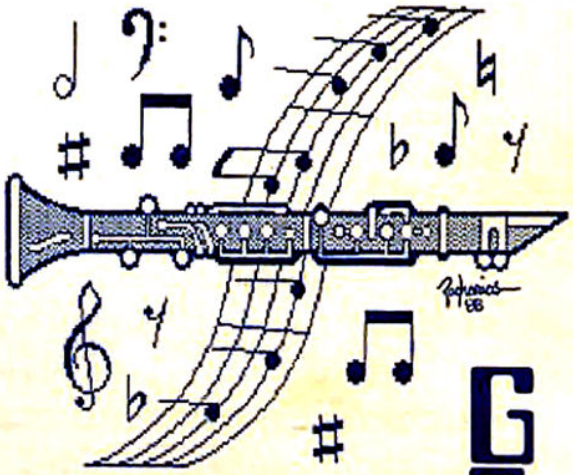
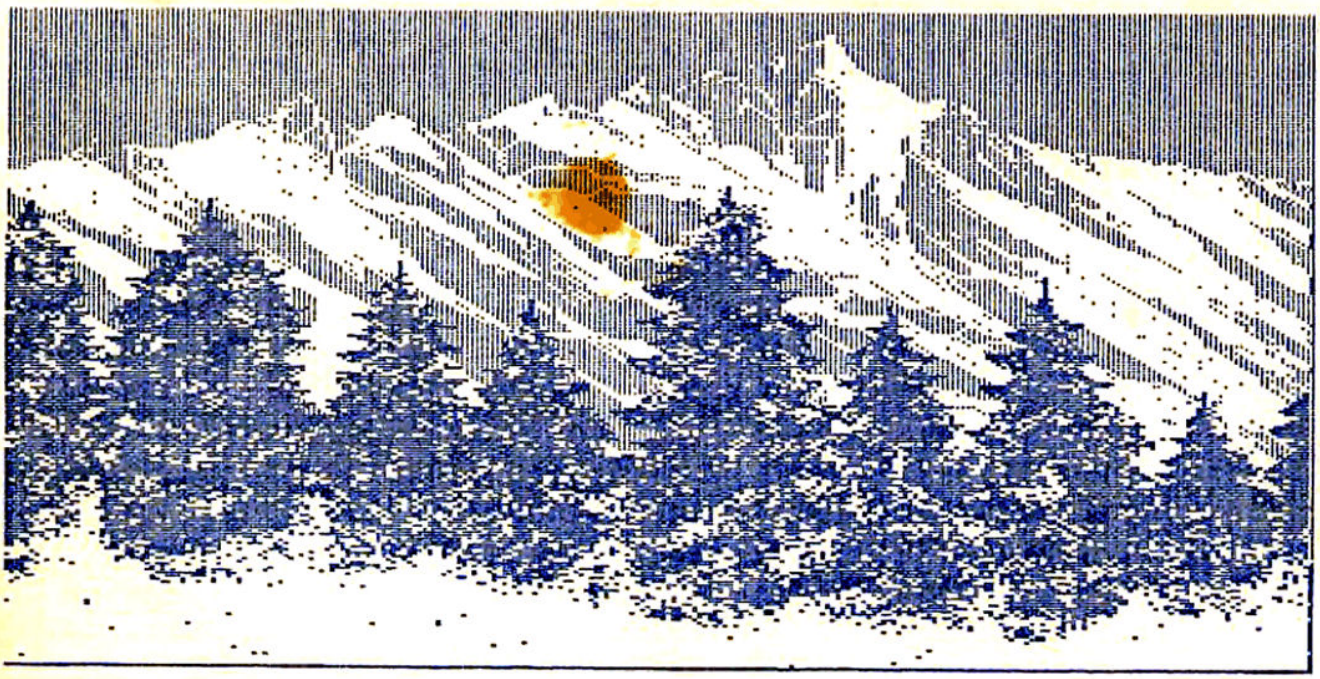


GREAT GRAPHICS

Left: *"R2D2"* by Carl Green, East Liverpool, Ohio, using ARTWORX (Novelsoft). Right: *"Musical Art"* by Dennis A. Zacharias, Yukon, Oklahoma, using ARTWORX and TECHDRAW (Zebra). Below: *"Winter"* by Bill Boehm, Bedford, Mass., using QL PAINT (Sinclair).





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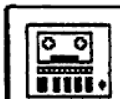
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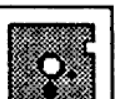

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MARCH/APRIL '88

Time Designs Magazine Company
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FROM THE EDITOR'S CLUTTERED DESK

Tim Woods

Just as I had predicted in our last issue, my editorial entitled *"SEND IN THE CLONES"* opened a can of worms, but in a much more favorable light than I had anticipated. And, along with our on-going Reader Survey, the TDM Mail Box was literally bursting at the seams! (Only one person, however, wrote to tell me that they had caught on to the, what I thought was, an appropriate title. It's from a Judy Collins song that was made popular in the 70's--"Send In The Clowns". That one person, was my good friend, the ever-talented Paul Bingham, who thought I should have included musical notes along with the title!)

As it turns out, I now know (thank goodness) that I probably won't be the last Sinclair user around. There are many, many of you who still feel that there is quite a bit of life left in these silver and black boxes. Others of you, it seems, due to professional commitments (or whatever) dabble with the more expensive machines, but still are very interested in what is going on here in TDM and the Sinclair community.

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Then finally, there are those of you who never intended to stay with us for very long anyway. The flashier "bells and whistles" are just too much of a temptation. Please do us all a favor, and sell (or give) your Sinclair computer to someone who would use it...and also give them your back issues of TIME DESIGNS (if you no longer want to read them).

Overall, I feel that "IBM PC and Clone bashing" would be an unproductive activity for us to follow. (But lord knows how many times we've heard our favorite machines bashed to death!) There is probably a great deal of info we could gain from our PC, Atari, Apple, and Commodore friends.

I closed the "Send In The Clones" editorial on a positive note...which I would like to expand on a bit. There are those of you who have accused me of being too positive (or "sugar-coated"). Of course I am aware of folks who have left our midst, and that some of the user groups have died on the vine. But I am equally aware of groups that are still "on fire" and can pack in 50 to 60 users at meetings, and also some fascinating research and development that is being conducted right now with our computers.

Why concentrate on "belly aching" and "crying" about how bad things are? Why not instead work together on some neat hardware and software projects. Let's recruit new members (and try to find those that have "hand-me-down" computers). Let's also try to turn around such negative bad mouthing we receive, by showing others what we can do...and start by having a <u>positive attitude</u> ourselves!

I don't mean to get up on a high and mighty soap box, but I am tired of hearing negative comments

Continued On Page 4.

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See last summer's Zebra 1987A Timex / Sinclair Products Catalog for more complete product descriptions

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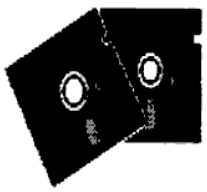

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(even from our own users). Often I have found that the root problem is frustration. There is so much that could be done by others in this area. If someone is frustrated, a simple question (or questions) answered goes a long way. More than often, its simply showing a user how to install a printer code in a program to get their full size printer going, or explaining how a disk drive is hooked up, etc. Those of you who are "more knowlegeable"...we really need your help, if you are willing to take the time to explain something in layman's terms, or solve a problem.

Enough said for the time being on the subject. Before we run out of space, I did want to share with you on what's coming up in TDM.

Our next issue's theme is TIMEX SINCLAIR USERS GROUPS. We'll try to provide the most update listing of groups in the U.S. and Canada that we know of, and also some international groups as well. We will also select the top ten newsletters produced by the TS groups (to give all those small time editor's a boost and a pat on the back). Along with the user group information, we will also list any dealer or company that still supports the Timex Sinclair community. And if that wasn't all, the May/June issue will have a complete TDM page index for the past four years of publication (this has been requested a lot!)...plus all of our regular programs, articles and features. Don't miss out (surprises as well!).

Then for the summer issue--July/August...that will be our issue devoted to STORAGE MEDIUMS. All about disk drives, program conversions, utilities, some of those "rare" Timex and Sinclair tape drives, and an excellent program by Floyd Chrysler who converted it from a published Spectrum program (with permission from the author) for the TS2068. It really speeds up things for those folks that still use tapes.

Moving on to the next section, I want to introduce you to Ralph Hammer, of Las Vegas, Nevada, who contributed a program called *"CUBE-IT"* in the March/April '87 issue of TDM. Ralph is talented in many areas including the graphic arts. The upcoming

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The book distributor didn't know where to sell Timex books anymore, so we were able to buy up a quantity of them for a great price. Now, while they last, you can get this complete collection of ten different titles for an incredible $10, just $1 per book. They contain lots of wonderful program examples with explanations, programming tips, and more. Act immediatly...just 100 sets are available! Order item #10BK. Include $3 for UPS shipping, $7 US mail or Canada

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USER GROUP issue is his "brain child", and he has designed a great looking cover for that issue. In additon to that, he will also be doing other art assignments from time to time. After twenty years in the Air Force, Ralph is facing retirement and a change of pace...we wish him the best of luck!

Now to kick things off for this issue, we have a number of guest editorials, letters, tips, and general mail...so we have elected to let Ralph Hammer go first. As always, we appreciate your comments and any correspondence is welcome. If you haven't filled out your READER SURVEY yet, there is still plenty of time (WHY HAVEN'T YOU!?!). Another copy of the survey is provided elsewhere in this issue. We will report on the survey findings next time. See you then!

IN THE MAILBAG

An Open Letter To The Readers

Every once in a while, Tim Woods (our Editor and Friend) will stand on a soap box, and declare his loyalty to the Timex-Sinclair community of computers. And for the larger percentage, we are right behind him. These little Z80-based computers are great to work with, and to have fun with.

A good number of people, be they common users, on up to the Dealers and the ones who keep us healthy, have stood the ground for our orphan. We putter and tinker around with these black and silver machines, making it work a little harder and a little better.

We have even banded together in small groups, meeting month after month, year after year, just for the simple pleasure of talking to someone who has a common interest--the Sinclair computer.

But I have started to notice a trend. There is a departing mode going on. People are leaving our midst, to "upgrade" to the Big Blue Compatible, and with them goes the little tidbits of invaluable information, and experience. I wish them good fortune, for they have polished their computing "baby-teeth" on our beloved brand. But let's hang onto their phone number or address...

For the negative trend is also appearing, there are groups out there that are struggling, suffering from low membership and purpose. Some of us are tucking in our tails, hiding our pride.

Let's dust off that old ZX81, loan it to someone who doesn't compute. If it's been awhile since you ordered that one little piece of software, or bought a new Disk Drive, or a full size printer or monitor, scrape your pennies together and assault your dealers (they'll love ya for it!). Bring a non-TS-user to your next group meet.

The time has come to start up a "National TSUG Organization". To think of its potential is mind-boggling. A whole continent of ideas, help, and service. Working together for standardization, software and hardware implementation, and even a logo to show our unity.

Think about it, and then take action.

Ralph Hammer
Sec/Treas.
Timex-Sinclair Users Group
of Las Vegas, Nevada

Guest Editorial:
The "Sleeper Has Awaken"

If you are a "DUNE" fan (as I am), you may have recognized that the title for this editorial was taken from that book (and movie)! But, that is exactly how I feel...now that I finally broke down and bought a Disk Drive System for my TS2068. That's right, all the program development that I have been doing...Desktop Publisher and all, was 100% TAPE based! Thinking back, I shudder at the thought of all the wasted hours doing tape loads/saves and verifies. How did I even stand it?

Oh, I know you've heard all this before...I know, I was skeptical too! Why would anyone want to spend so much money on a "dead" computer...how much longer is that little grey box going to work anyway...why not spend the money and get a real computer...all very good questions!! All these (and more) I asked myself for the better part of 4 years now. I guess it took me that long to find the answer: BECAUSE I WANT TOO! That is what it all boiled down to. This little grey box is a REAL computer, not a toy! The simply fantastic programs available on it is proof enough for that. My little grey box has been going 20 to 30 hours per week, week after week, for 4 years...and when this one dies, I'll dig out my spare, and when that one goes, I'll have had time to get a second spare...all for a lot less money than one of their "real computers". And how reliable is Big Blue (or a Clone) anyway?

But what really sold me was the new possibilities available with the disk system. The Aerco Disk Drive System has 64K of extra memory built into the interface, that is expandable. The Larken RAMdisk provides a second form of added capabilities, and can use the Aerco 64K as a RAMdisk without adding anything to the system. In each case, the MEMORY BARRIER is broken!

My new desktop program (Pixel Print Professional) uses the Aerco RAM to BANK-SWITCH a second Pixel Print column, allowing the user to load and switch between left and right columns in the Desktop Program. The "Print-a-Document" program (part of the same package) uses BANK-SWITCHING to hold and print both left and right columns simultaneously! This provides perfect column alignment in the twin (32 character) columns, and allows real 64 column Desktop Publishing when importing files from TASWORD or other word processors that create ASCII text files, in the single 64 column format. The LARKEN version will use the RAMdisk to hold file data and provide fast data transfer similar to the Aerco Bank-Switching. Volatile or non-volatile RAM cartridges can provide quick and easy add-on memory for tape and microdrive users too!

As the add-on memory systems become more popular, watch for more and more programs to be written to use these capabilities! Certainly the desktop programs are only one of many new applications that will take advantage of this new break-through!

So, wake up your computer and do what your inner self has been wanting to do for a long time now...send in that disk drive order, you won't regret it!! (For your information, I have compiled a short list of LOAD times for a variety of programs I use regularly. These times are for comparison purposes only...like government MPG figures...but somwhat more accurate!)

S. D. Lemke
Lemke Software Development
Wichita, Kansas

Typical AERCO DISK vs. CASSETTE load times
(time in seconds)

Program	AERCO	CASSETTE
Pixel Print v3.2	8.17	93.76
TASWORD II	7.05	116.78
Uu-File (with printer driver and typical data file)	14.33	200.70
TIMACHINE	26.99	156.92
Pixel Print Data	4.88	111.96

Newer Sinclair User

I was very pleased to recieve the JAN/FEB issue of TDM magazine and see your questionaire on what track you should be taking. For myself, I am interested only in articles concerning T/S equipment from TDM; that is, if I wanted articles about IBM, I would seek out national publications or their user groups which are quite strong as we all know.

As to why I am interested in T/S, I suckered in on the PC8300 (a TS1000 clone), and through the Dallas Timex User Group, changed very quickly to a model TS2068. I am a working engineer (1950 vintage) where in my job I have access to and use daily, a nation wide IBM network system operating five 3090 machines with operating systems of M204, VMCMS, and TSO; these are networked via a high capacity data transfer system to our scientific computer center where we use VAX, CDC, and CRAY mainframes. The present CRAY XMP14 is being replaced in March with an XMP28. These machines will compile a 10,000 line Fortran program in about 1 second. My department software is being moved to the CRAY, and we will use a VAX 8800 as the front end of this system. So for many years I did not want any kind of PC in my home, but after buying a Radio Shack TRS-80 Pocket Computer at a camera fair, and being exposed to BASIC on it...then along came the PC8300. The T/S User Group recommended the TS2068, and when a T/S user went to Atari, I wound up with a TS2068, TS2040 printer, quite a bit of software; and since then I have added two disk drives with the LARKEN operating system, John McMichael's Commodore plotter, and lots of software from the SINCUS News Exchange Program.

Tim, we all wish you well in the magazine, and realize that the orphan will never be a roaring success, but the only reason I subscribe to TDM is the fact that it is a good source of T/S information and I do not have to sift through many unrelated articles. I actually would prefer a magazine devoted to only the TS2068, but know this is not practical (and many of the earlier programs for the TS1000/TS1500/ZX81 can be utilized fairly readily if you have an interest.

John D. Austin
McKinney, Texas

Puzzle Of The Month Fan

If King Xerxes of the JAN/FEB "Puzzle of the Month" could afford to have over 40 wives, he obviously could afford a computer. (Probably a Zorba.) We have to ask why he needed the last hint to determine the number of animals brought to him.

From Cedric Bastiaans' program, we know there are two possible solutions, one with 46 wives and one with 52 wives. Let's assume the king had 46 wives. I'm sure an old hacker like Xerxes wrote a program similar to Cedric's. There would be one difference. Before he received the last hint, he wouldn't yet know the number of oxen was less than half the total (this was the final hint), but he would know that the total of all the animals was equal to 46. To see what the king's earlier programs must have looked like, change one line in Cedric's program. Instead of the AND 0 <W/2) in line 65, use AND W=46. The rest of the program can stay unchanged. Run the program. You'll get exactly one answer. If Xerxes had 46 wives, he would have had the answer without asking for the final clue. So we can assume he didn't have 46 wives, and the solution totalling up to 52 is the only correct one. I hope that Xerxes wasn't a complete computer nerd who spent all his time on his machine. Can you imagine 52 computer widows?

This is a great puzzle because it requires both computer and human analysis. I came across this puzzle at the perfect time...reading TDM on the way to work! That day, my boss didn't come in, so I had all day to work on it. Since I'm not sure if my boss or anyone in his family reads this magazine, I 'd better sign off as...

Name Withheld
Upon Request

Last Of The Simple Computer?

I have to believe that I am not alone in my resistance to upgrading to a new computer every two years. It is not the cost--I have plenty invested in my ZX81 systems. I just feel that I could spend the next decade or so exploring all the possibilities of the ZX81 with various hardware and software improvements available.

The ZX81 is, I feel, the perfect "base" from which to explore the world of the computer and the Z80 microprocessor. In a recent letter from Fred Nachbaur (Silicon Mountain Computers), Fred sums it up much better than I ever could. Allow me to quote:

"I can't help but wonder, though, if one day the simple computer won't reappear. It seems that the whole computer industry is shooting itself in the foot by coming out with fancier computers at lower and lower prices. Already it's at a point where the best you can hope for with some of the new machines is to become a capable user. Forget about trying to understand it. At least with the ZX81 one stands a chance of learning what makes it go."

Van S. Vangor
Bethlehem Tool
Island Falls, Maine

Timex/Sinclair--"The Real Thing"

I called a man up just the other day,
"I'd like a power supply," I had to say.
"For a disk drive on my 2068."
He replied, "forty dollars."
I said, "Hey, that's GREAT!"

But then he went on to ask, "What could it do?"
I sat back and smiled and said, "How about you?"
"Oh, I started with others,"
He said with dismay,
"But look around now, where are they today?"
Too small and too slow and not much real use there.
So they sit in my closet, under the stair."

"For just a few bucks you clone an XT!"
(Having used them before) I stated, "Oh, gee."
"Move up to a machine you can DO SOMETHING with,
And you can SAVE all kinds of bucks: IF
You build it yourself, it'll be QUITE a machine.
With CP/M and MS-DOS, you can have a custom dream!"

"Why thank you," I said, "I'll keep it in mind,
And give ya' a call if I can find the time."
But Laughing quite loudly as I hung up the phone,
I thought, "I've got the REAL THING, who NEEDS a CLONE!"

Clint Cook
Santee, California

ZEUS UTILITY Revisited

In the MAY/JUNE '87 issue of TDM, we published a short TS2068 utility by Richard Hurd, that converts ZEUS source code files into an ASCII file for either MSCRIPT and TASWORD Two. Evidently, there were some problems with the original listing. Here is the corrected version, including step-by-step instructions.

1) LOAD ZEUS (assembler) CODE
2) Enter this little BASIC listing

```
 5 REM HERE TO ENTER CODES

10 LET T=0
20 FOR F=61431 TO 61624
30 IF T=0 THEN PRINT F;:LET T=6
40 INPUT N
50 POKE F,N:PRINT TAB T;N;
60 LET T=T+4:IF T>=29 THEN PRINT:LET T=0
70 NEXT F
80 STOP
```

```
100 REM HERE TO READ CODES

110 LET T=0
120 FOR F=61431 TO 61624
130 IF T=0 THEN PRINT F;:LET T=T+6
140 PRINT TAB T;PEEK F;
150 LET T=T+4:IF T>=29 THEN PRINT:LET T=0
160 NEXT F
```

3) Now enter the list of 194 bytes of code I've included. SAVE this along with the names list from ZEUS (415 bytes) as "Z_2_M/T" CODE 61015,610

4) Just add this code to the BASIC listing from the TDM article and you have it.

22M/T

61431	33	0	128	17	79	183
61437	35	35	126	254	10	40
61443	41	254	128	48	47	254
61449	0	40	4	18	19	24
61455	238	62	13	18	35	19
61461	126	254	255	32	7	35
61467	126	254	255	40	70	43
61473	62	237	186	32	215	62
61479	256	187	48	59	24	208
61485	35	70	62	32	18	19

61491	16	252	24	199	203	191
61497	14	0	229	33	87	238
61503	185	40	18	245	35	126
61509	254	8	40	6	254	10
61515	40	2	24	244	241	12
61521	35	24	235	126	18	35
61527	126	19	254	8	40	6
61533	254	10	40	2	24	241
61539	225	24	152	235	17	79
61545	183	167	237	82	229	193
61551	201	176	185	112	126	42
61557	114	240	6	64	62	32
61563	119	35	16	252	42	112
61569	240	1	0	0	126	254
61575	13	40	8	254	255	40
61581	31	12	35	24	243	35
61587	229	237	91	114	240	42
61593	112	240	237	176	42	114
61599	240	1	64	0	9	34
61605	114	240	225	34	112	240
61611	24	199	42	114	240	1
61617	48	117	183	237	66	229
61623	193	201				

NEWS

SUNSTATE TIMEX SINCLAIR WINTERFEST '88

A lighter attendance than expected and heavy rain didn't dampen the spirits of those T/S users who gathered in Orlando, Florida on March 5 and 6 for the Sunstate T/S Winterfest. A good time was enjoyed by all those who could make it. The area is one of the nation's most popular tourist spots, with EPCOT and Walt Disney World just a short drive away.

The dealer tables drew the most interest, with companies such as Zebra Systems, Sharp's, A+ Computer Response, Foote Software, Syncware News, WDJUP Co., and Time Designs; displayed their merchandise.

There were also some interesting Sinclair "one-of-kind" bargains to be found. For instance, A+ had boxes of items that were retrieved from the old Sinclair warehouse in Boston, when it shut down operations a few years ago. They offered packs of ZX81 ROMs, 2K RAMs, ZX80 kits which were in the original packaging, and the unique Sinclair FM Radio Watches...which were quickly snatched up.

Another interesting display was put on by Mr. Eric Johnson, of Orange City, Florida, who obtained a large stock of surplus Timex Sinclair items from a relative who works for Timex in Connecticut. Among the most notable were a series of TS1500 circuit boards that had been issued by Timex, from an early prototype board, to a later compact design from Portugal. There was also a good quantity of TS2068's for sale.

Lemke Software Development

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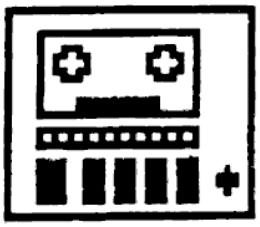

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"son"	"udg" version 2 allows multiple fonts and much more (in TDM N/D '86)
"windows"	BASIC full-screen window facility + restores screen (in SWN N/D '86)
"cfe/b"	BASIC Classy Front End new fonts utility (as appeared in TDM M/A '87)
"cfe/mc"	Complete Classy Front End fonts M.C. version (as in TDM J/A-N/D '87)

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That's right. Five Top-quality TDK cassette tapes allow almost 3000K of 2068 program storage. And I'm selling them at less than $1 each! Not seconds or blems, these are brand-new TDK D60 cassettes. In all my years of using them I've never had one sent back because it was faulty.

TDK CASSETTE 5-PAK.....4.99 each
(If ordering with other software these will be shipped free, otherwise please ad $2 per pak postage and handling)

(continued from page 7)

The Larken 256K RAMdisk for the TS2068 was unveiled for the first time in public. The small compact board features one-quarter Meg of non-volatile RAM, and when used with the Larken LKDOS cartridge, it operates with standard cassette-type LOAD and SAVE commands.

Along with the dealer tables, there were tables with catalogs and brochures from some absentee vendors, and a few user groups, including the Northeast Florida T/S Users Group (Jacksonville), the TASBAM group (St Petersburg and Tampa), the CATS group (from Washington, DC), and the SMUG group (from Wisconsin, had tables as well.

On Saturday evening, a meeting was held to discuss the idea of a National Timex Sinclair user Group. Some proposals were presented and comments were solicited from the audience. Overall, it was the consensus that such an organization would help unify and strengthen our TS community, and benefits such as a central Public Domain software library would be offered. (Note: read the accompanying article on the national group for further details).

A National Sinclair Organization

S.N.U.G. (Sinclair Northamerica Users Group) is an idea spawned by the organizers of the Sunstate T/S Winterfest, and has evolved from suggestions and comments from other Timex/Sinclair users.

The intent of SNUG is to provide a forum for exchange of ideas. It would be a source of information, such as a listing of active members, active user groups, Sinclair-specific BBS's, an active library of Public Domain software, and a listing of available shareware and freeware. Later on, proposed industry standards for hardware and software would be adopted. So as to not have to "re-invent the wheel", an already established national group would be used as a model to base the group on (such as CORSA--the Corvair Owners Assn.). SNUG would act as an umbrella organization, with regions being developed to tie in with established user groups in those areas.

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It is not the intent of the SNUG organizers to infringe on, or supercede any already established group or company. It is only intended to show some strength to the industry that Sinclair is not dead, and the mere fact that an organization can be formed, will show unity and interest in Sinclair computers. Even a North American "Calendar of Events" could be established to help co-ordinate future plans and events.

SNUG needs the support of every single Sinclair user in the U.S., Canada, Mexico (or for that matter--anywhere). If you have any comments, questions, ideas, etc...contact either Mel Nathanson, 7515 Arbordale Drive, Port Richey, FL 34668, (813) 863-5552; or Mary-Lynn Johnson, 190 Hickory Woods Ct., Unit 3-C, Deltona, FL 32725, (305) 860-2465. The organizers of SNUG are putting a time limit of June 30, 1988 on their idea. If there is no response or support of the idea, then they will not proceed further. If there is input, an update will appear here in TDM.

SUMMER WESTCOAST TS FAIR FEATURES AN "ALL-STAR" CAST

The "perfect" summer vacation destination for any Sinclair fan is the emphasis for the Third Annual International Great Northwest TS Mini-Fair. What was once a regional affair (held last year in Seattle), has expanded into a two-day event.

The show will be held on Saturday and Sunday, August 6 and 7, at the Cosmopolitan Hotel in Portland, Oregon. It is hosted by the CCAT/S User Group of Oregon, along with three other northwest Timex Sinclair groups, and is co-sponsored by RMG Enterprises and Time Designs Magazine.

Many of the exhibitor's and guest speakers are already committed. To date, Zebra Systems (from New York), Sharp's Inc. (from Virginia), Ed Grey Enterprises (from California), American Micro Connection (from California), Jack Dohany (from California), RMG Enterprises (from Oregon) and Time Designs (from Oregon), are signed up to participate as dealers. Confirmed guest speakers include Jack Dohany (author of many software enhancements for the TS2068), Mike de Sosa (author of "Taking The Quantum Leap"), Ed Grey (telecommunications expert), Syd Wyncoop (TS2068 software developer and TDM columnist on Z80 Machine Code), Michael Carver (programmer and TDM columnist), Vince Lyon (author of "Archive Master"), and Norm Lehfeldt (QL programmer). Tentative at press time: Fred Nachbaur (Silicon Mountain Computers), Stan Lemke (Pixel Print), Bob Orrfelt (EPROM enhancements for the TS2068), Wilf Rigter (ZX81 expert), and representatives from Cambridge Computer (Z88).

User groups from California, Oregon, Washington, Nevada, British Columbia (Canada), and Wisconsin, are scheduled to participate.

On Saturday night (August 6) at 9:00pm, a Round Table Sinclair Forum will be held. This informal get-together will include a panel of noted Sinclair "experts", which will field questions from the audience. This will likely be the high point of the weekend.

One feature of the show will cater to the non-computer spouses and family members. For the kids, a professional clown will entertain, and for older folks (and the kids)...inexpensive guided bus tours will depart daily to explore attractions of the northwest (which include the Columbia River Gorge, Portland Zoo, Oregon Museum of Science and Industry, and views of Mount St Helens).

Another feature of the show, will be to invite the general public to come experience "hands on" demonstrations of Sinclair computers. This is to combat the "fear" that some people still harbor towards personal computers.

Quality accomodations at the on-site hotel are very reasonably priced. Double occupancy for only $38 (plus tax). The hotel has a coffee shop on the ground floor, and a restaurant/lounge on the top floor--with veiws of the city lights at night and entertainment. The Cosmopolitan Hotel (1030 N.E. Union) is located just off of Interstate 5, and is close to bus lines, city transportation, and just a short trip from the airport. Hotel phone number is (503) 235-8433, and mention the "Timex Sinclair Mini-Fair" to the reservationist.

Start making your vacation plans to participate in this Timex Sinclair happening. For further information, contact the show producer, Rod Gowen, by writing to- 1419 1/2 7th Street, Oregon City, Oregon 97045; or call- (503) 655-7484. If you send a large self-addressed envelope with two 25 cent (first class) stamps, Rod will send you a complete packet of information including registrations forms, and brochures of area tourist attractions. A BBS is also online in the evening and morning hours (PST) for information. Phone number: (503) 656-8072. Modem setting: 8/1/None.

MIDWEST REGIONAL TS CONFERENCE

Another Sinclair gathering is planned for August 26 and 27, in Cleveland, Ohio, at the Beck Center for the Arts. The Greater Cleveland Sinclair Users Group is the host, and they are looking for other groups, guest speakers and vendors to participate. The theme of the event will be "users - learning from other users".

Inquiries about the regional conference can be directed to: Andy Kosiorek, 2192 Glenbury Ave., Lakewood, Ohio 44107, CompuServe ID# 75046,3420. Or try the Timelines BBS: phone (216) 671-6922, setting- 8/1/None.

EVER HEAR OF THE T/S 3068? (AND OTHER MATTERS)

At a recent meeting of the LIST (Long Island Sinclair Timex) users group, the former head of the Research and Development department of the Timex Computer Corporation, Billy Skyrme, attended and gave a talk. Mr. Skyrme is currently the president of PSION, Inc., the manufacturer of the Organizer pocket computer.

While, Mr. Skyrme admitted that he still was under contractural agreement with Timex, and that certain information couldn't be discussed, he did mention some items that turned many members of LIST green.

The TS2068, related Skyrme, was to have been either a "cleaned-up" 48K Spectrum, or a totally re-engineered design. While a clean Spectrum was submitted for FCC approval, the later model was selected for manufacture.

Another computer was in the works, called the T/S 3068. It would have featured 1 Megabyte RAM, Virtual Memory, 256 colors and high-res graphics. "The only machine...that would be in its class today is the Amiga", stated Skyrme. The T/S 3068 would have retailed for only $199.95.

Another interesting fact, was that the "BEU" (Bus Expansion Unit) for the TS2068, as seen in the photo published by TIME DESIGNS (see July/August '86, page 23) was, according to Skyrme, completely engineered and ready for to be production. With an internal floppy disk interface built in, Timex would have sold external 3.5" drives (in little silver boxes) for as little as $49.95. This plan was far enough along that Timex had a supplier lined out for the drives.

Most of the information on proposed products for the TS2068 (and the TS3068) will never be made public due to a myriad of legal reasons, and the engineers involved in the project have all gone their separate ways.

Mr. Skyrme also demonstrated the Organizer and accessories to the LIST group. This hand held computer (upgradeable to 256K RAM), has sold well in markets where recording and calculation of numbers in the field, and other simple "type-in" answers are required.

The LIST group can be contacted by writing c/o Harvey Rait, 5 Peri Lane, Valley Stream, NY 11581. The above information was supplied by member, Joe Newman.

TDM COLUMNIST MAKES "BIG TIME"

Duncan Teague, a regular contributor to TIME DESIGNS and other Sinclair publications, is now a regular contributor to COMPUTE! Magazine.

Duncan's connection to COMPUTE! began when a whole chapter on a book called "USING NEWSROOM" by Gregg Keizer (and published by the COMPUTE! Library Selection division of the magazine) was devoted to how a newsletter was published by Duncan and some students, Mr. Teague is the current director of the Craigmont Planetarium in Memphis, Tennessee, which is financed and operated by the Memphis City School District; and is also a professional astronomer. The "in-house" publication is called "SKYLIGHTS", and is produced with NEWSROOM, a MacIntosh computer, and a laser printer.

NEWSROOM is a desktop publishing program which is available for many different types of PC computers (except the Sinclair...but then we have PIXEL PRINT). It was one of the early entrys into this growing market, which has bred even more powerful programs.

Through the book, Duncan met the editor of COMPUTE!, and was asked to do software reviews of commercial Apple and MacIntosh programs. His writings appear in the most current issues.

Rest assured, Duncan has not forsaken his Sinclair equipment, which he still uses at home (a TS2068 and Aerco disk drive system, and other equipment). In fact, most recently, he has taken over the publishing and editing of his church's newsletter, and uses Lemke's PIXEL PRINT desktop publisher for the task. (For an article on TS2068 Desktop Publishing by Duncan Teague see the Sept/Oct '87 issue of TDM). Watch for further information and tips from our resident desktop expert.

SOME OF THE BEST PROGRAMMING AROUND

If you really want your Timex Sinclair 2068 to work for you like it was originally intended to do, then you need to take a look at some of the very excellent programs written by Eric and Kris Boisvert of BYTE POWER.

To date, they have put together ten "issues" of their electronic magazine on cassette, which adds up to over 100 programs for the 2068! (Byte Power Magazine is also Spectrum compatible).

In the most current issue, the cassette contains nine programs, plus documentation in a text file. "CONFLICT" has some of the best screens we've seen, perhaps only rivaled by a few commercial Spectrum programs. There are four other games, plus a lotto number selection program, a music utility, and a boot utility for the Larken LKDOS cartridge.

If you have never seen what this brilliant software team has cooked up for the TS2068, then you need to send for a sample issue of Byte Power for only $5.50. Write to: 1748 Meadowview Ave., Pickering, Ontario, Canada L1V-3G8. Now there is no reason for anyone to complain about the lack of good T/S software...there's plenty of it available from Byte Power!

TWO NAMES CHANGE - SERVICE REMAINS THE SAME

ED GREY ENTERPRISES (formally Grey & Clifford Computer Products) continues to support the Timex Sinclair market. A new BBS called the "Grey Matter BBS" is now online (213-971-6260, settings: 8/1/None, supports 300/1200 baud). A FREE catalog of Timex specific products and non-specific computer items is available by writing to: PO Box 2186, Inglewood, CA 90305, or calling (213) 759-7406, and also requests can be accomodated on the BBS.

Assembled and tested versions of the popular Z-SI/O RS232 Serial Card, are no longer available. However, a new BARE BOARD PACKAGE is now available for the TS2068 computer with complete documentation, for only $24.50 + $2.50 S&H. Write to Ed Grey for details.

Another TS dealer, Variety Sales, has changed their name to VARIETY COMPUTERS & ELECTRONICS. You can write for their free catalog at: 325 W. Jersey St., Suite 2-D, Elizabeth, NJ 07202.

FROM THE RUMOR MILL

Fred Nachbaur, of Silicon Mountain Computers, is reportedly developing a Timex Sinclair clone of his own, which will incorporate many improvements and enhancements. No further details are available at this time.

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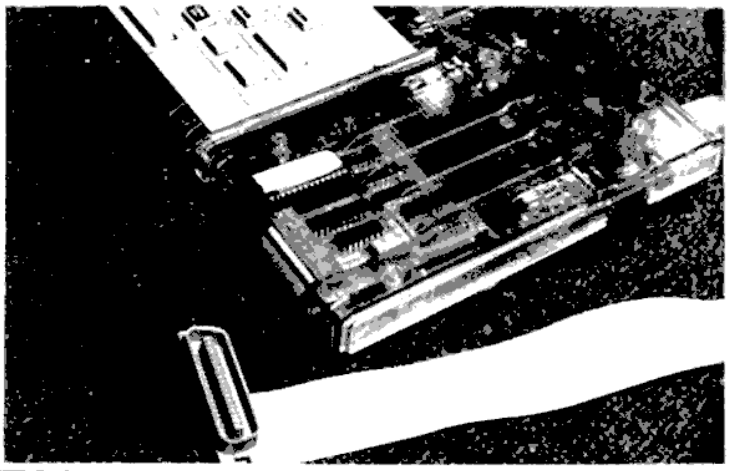

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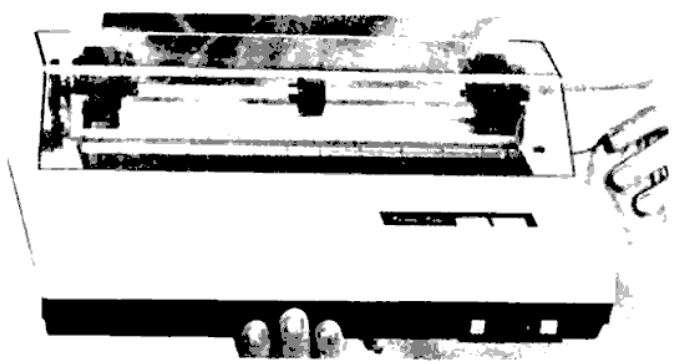

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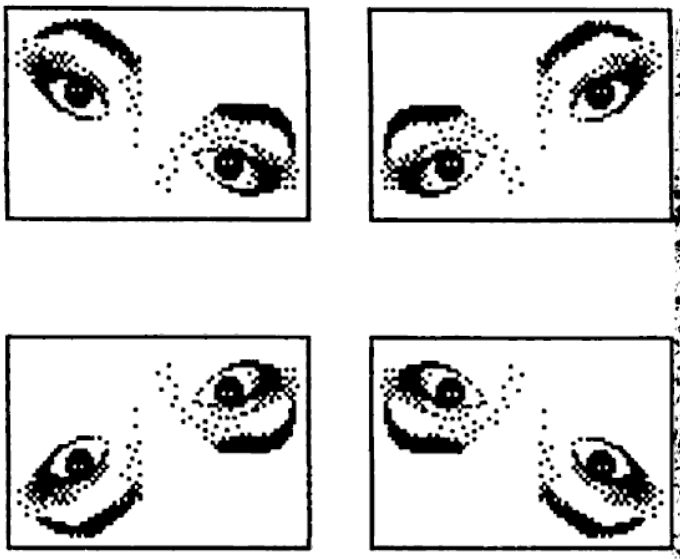
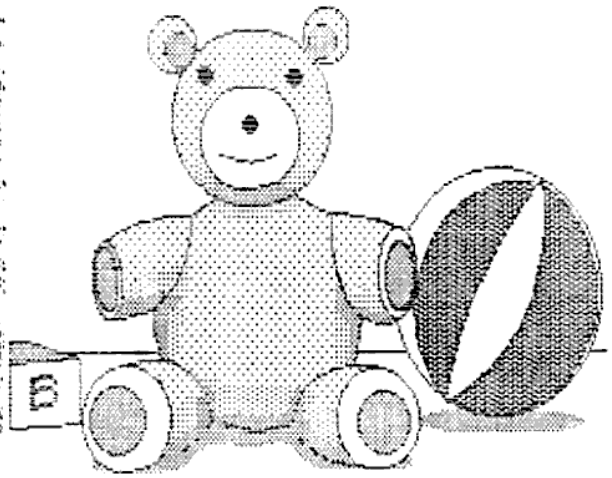


Artwork by William McBrine, of Salisbury, North Carolina, using his own art program called DRAW 512.



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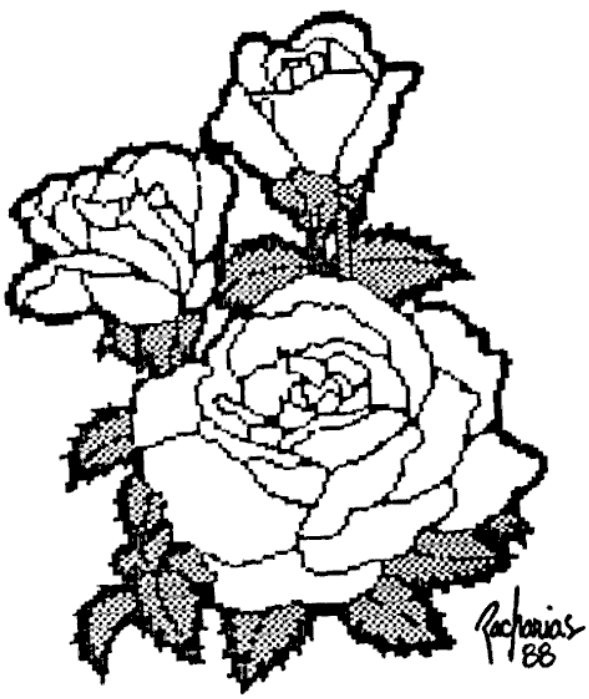

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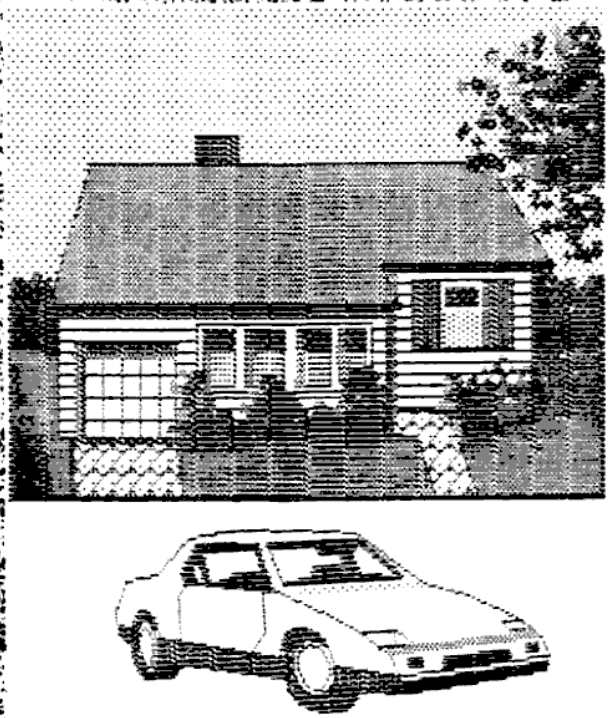
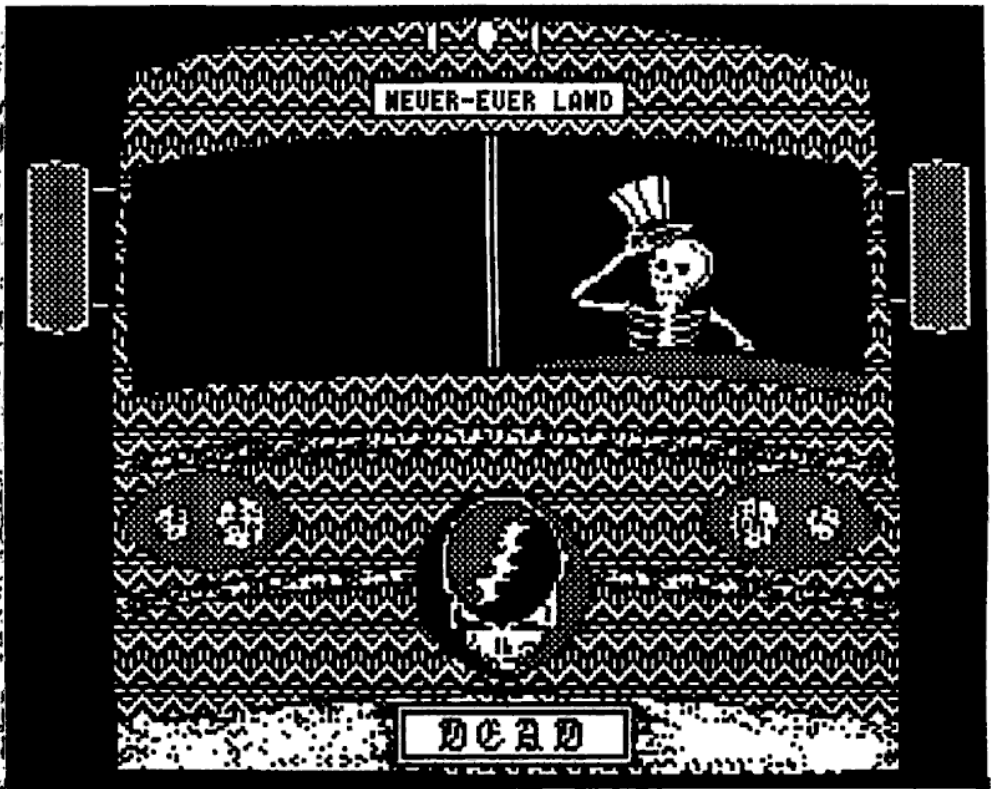


"House and Car" artwork by Arthur B. Marzano, Philadelphia, PA, using TECH DRAW JR (Zebra).



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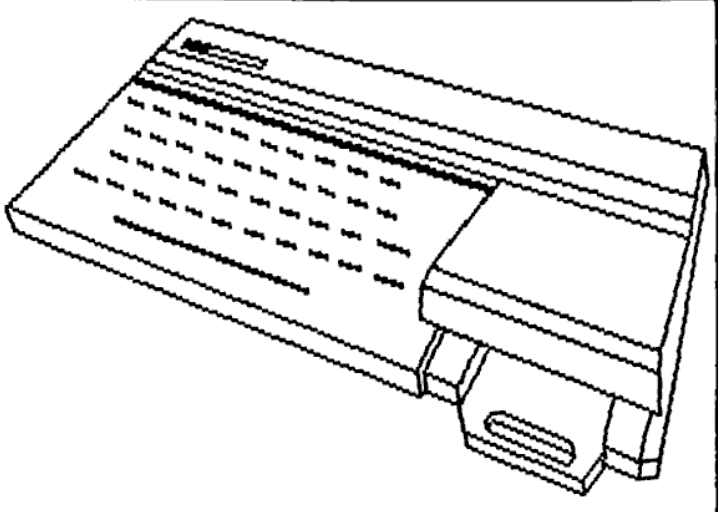

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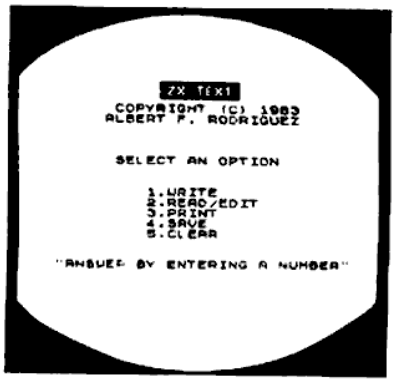

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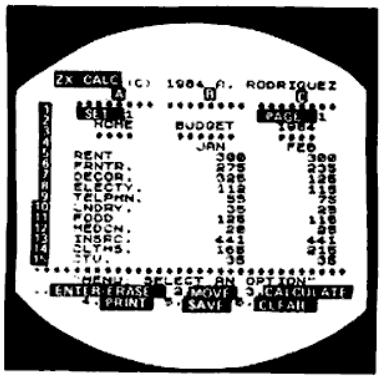

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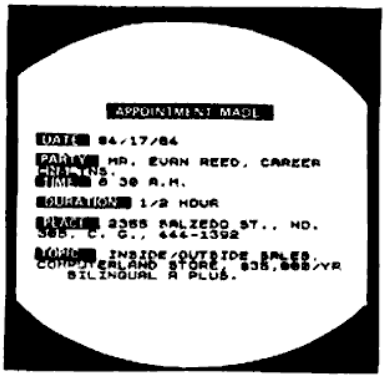

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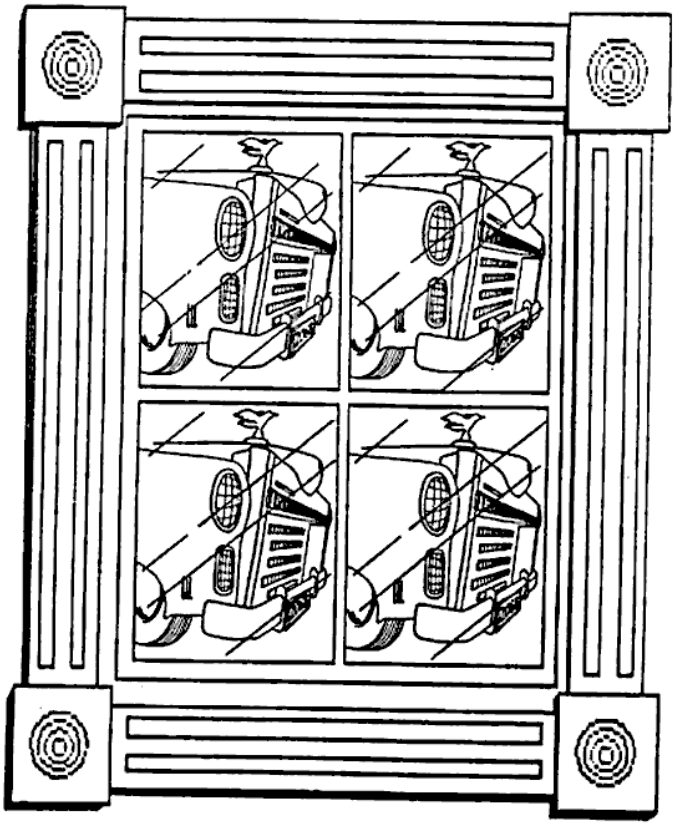


CLASSY FRONT END WINDOWS

by Paul Bingham

It is time to begin the next phase of CLASSY FRONT END: Windowing. Now I have cooked up two kinds fo windows for CLASSY. One is the rectangular kind with shadows down two sides, and the other is a small set of round windows for quick footnotes, status reports, and the like. These round versions of post-it-notes I call PORTHOLES.

Now as usual the total program is much too long to finish up in one issue of TDM, in fact we'll be real lucky to finish it all next time. I also like to leave readers with something they can run and use each issue. So CLASSY windows has been divided up into some useful, stand-alone routines, some of which we will explore this time. If you type in the listings, try to follow the line numbering as they appear. Later, when we "put it all together" merging these smaller programs to form a big one will be a breeze. The "Windows & Portholes" program we will end up with, will be a complete machine code windowing program which can work by itself or with the CLASSY FRONT END fonts (parts 2 thru 5) we finished up last time.

Lets start our discussion on 2068 windows by discovering that the 2068 treats the standard screen as three windows already! What? That's right, Uncle Clive's little wonder addresses the screen in the display file as three separate sections. I've mapped these in Figure 1 as A,B,C (the last two lines of C being the edit lines). Now if your having trouble visualizing this, let's experiment for a moment. Type in a line like: 10 FOR t = 16384 TO 22527 : POKE t, 255 : NEXT t. Now RUN it and watch the display carefully. The program is directly pokeing the code for eight black pixels (255) into each consecutive address of the display file. Notice that it fills all of the window A before starting window B and so on. In the old ZX81, the display file was much simpler. With the 2068 we will have to work around these set windows to produce our own custom sizes.

Fortunately the 2068 display file does have a system which a little code can work with to produce whatever we might want. Each byte holds the information of eight bits, each of which produces a pixel. If all of the bits are sent (i.e., equal 1), like our code 255, then all the pixels are blackened in. Each of the screen bytes along one row are also consecutive in memory. Notice on our map that the first byte is address 16384 and as we progress along the 32 COLUMNS across the last in the row is 16415 (or 16384 plus 32). At the beginning of the next ROW (at address 16416) the next byte appears eight pixel elements below the previous row. This is because each screen character is eight pixels high as well as eight pixels wide. Looking at the exploded view of a screen character with our map you will see this. Each row of pixels in a character is stored at an address 256 bytes greater than the last.

Now to make sense of all of this type in Listing 1 entitled "screen address finder". The code in DATA lines 1600 to 1630 and disassembled in Figure A takes the two coordinates of a character location like we use in a PRINT AT statement and figures out the address of the top byte of that position in the display file. This is very important to us because we will need such information if we want to draw windows and also hope to restore any original stuff to the screen when we erase the window. Listing 1 randomly chooses some PRINT coordinates in the BASIC found in

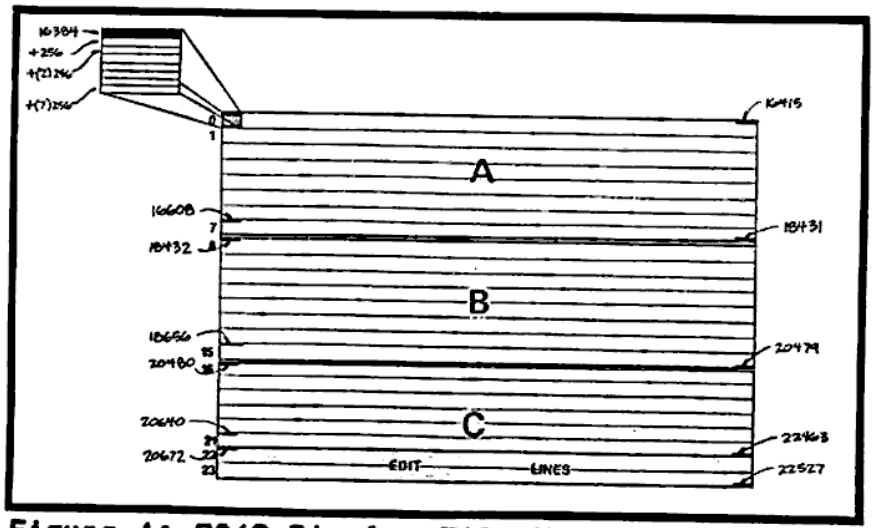


Figure 1: 2068 Display File Map

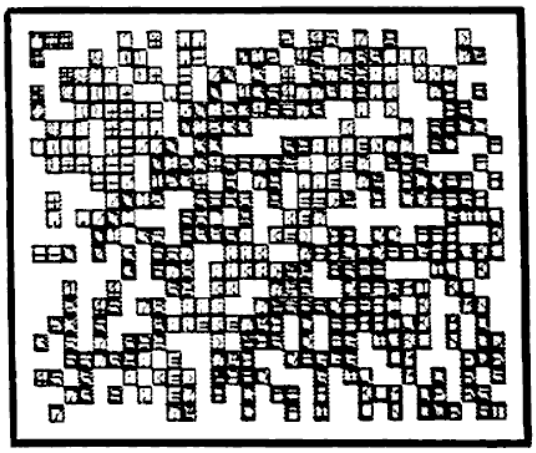
```
   1 REM   screen address finder

   5 CLEAR 55000
  10 FOR t=55000 TO 55061
1600 READ o: POKE t,o: DATA 213,
229,17,0,0,33,15,215,229
1610 DATA 197,245,122,213,203,10
3,32,24,203,95,32,27,33,224,63,1
7,32,0,71,4,25,16,253,209,22,0,2
5,235,241,193,225,233,203,167,33
,224,79,24,232
1620 DATA 203,159,33,224,71,24,2
25
1630 DATA 237,83,176,92,225,209,
201
1700 NEXT t
1710 LET x=RND*31: LET y=RND*21
1720 POKE 55003,x: POKE 55004,y
1730 LET k=USR 55000
1740 LET a=256*PEEK 23729+PEEK 2
3728
1750 POKE a,255: POKE a+7*256,25
5: FOR t=1 TO 6: POKE a+t*256,12
9: NEXT t
1760 PRINT OVER 1;AT y,x;CHR$ (x
+y+33)
1770 GO TO 1710
```

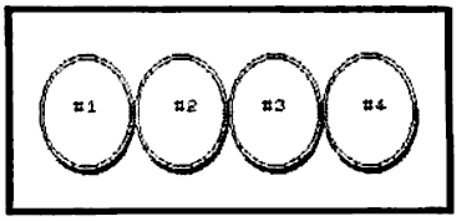
Listing 1

```
screen addr CK TYPE report:

1       : 30    : 3947
5       : 13    : 1555
10      : 27    : 3008
1600    : 92    : 5613
1610    : 368   : 16429
1620    : 68    : 3835
1630    : 69    : 3963
1700    : 3     : 628
1710    : 28    : 2447
1720    : 30    : 3459
1730    : 16    : 1975
1740    : 39    : 3300
1750    : 91    : 6796
1760    : 31    : 2663
1770    : 12    : 1157
```



Listing 1: Display



Listing 2: Display

```
   1 REM      porthole demo

   5 CLEAR 55000: PRINT AT 9,9;"
poking code"
  10 FOR t=55000 TO 55168
  20 READ a: POKE t,a
1400 DATA 1,0,88,197
1410 DATA 193,121,197,205,230,48
,193,120,197,205,230,48,62,28,20
5,230,48,205,134,38,193,121,197,
205,230,48,193,120,197,205,230,4
8,62,30,205,230,48,205,134,38
1420 DATA 193,121,214,26,79,120,
214,13,71,237,67,125,92,197,62,5
6,205,230,48,62,17,205,230,48,62
,3,205,230,48,205,237,38,193,121
,198,7,79,120,214,11,71
1430 DATA 237,67,125,92,197,62,5
0,205,230,48,62,18,205,230,48,62
,2,205,230,48,205,237,38,193,237
,67,125,92,197,62,48,205,230,48,
62,12,205,230,48
1440 DATA 62,2,205,230,48,205,23
7,38,193,121,198,4,79,5,5,237,67
,125,92,197,62,46,205,230,48,62,
21,205,230,48,62,2,205,230,48,20
5,237,38
1450 DATA 193,217,33,22,43,217,2
01
1500 NEXT t
1510 CLS
1520 FOR x=1 TO 4
1530 POKE 55001,32+60*(x-1)
1540 RANDOMIZE USR 55000
1550 PRINT AT 10,3+7.5*(x-1);"#"
;x
1560 NEXT x
```

Listing 2

```
porthole demo CK TYPE report:

1       : 37    : 3528
5       : 45    : 4386
10      : 27    : 3123
20      : 8     : 1436
1400    : 36    : 3874
1410    : 389   : 20944
1420    : 389   : 18625
1430    : 370   : 18794
1440    : 356   : 17461
1450    : 68    : 3804
1500    : 3     : 628
1510    : 2     : 515
1520    : 19    : 1303
1530    : 43    : 2707
1540    : 14    : 1762
1550    : 47    : 2769
1560    : 3     : 632
```

lines 1710 through 1770 and then calls the code to get an address. Line 1740 pulls this info out of a little spare RAM address the code uses as a safe place to tuck such things. Line 1750 then "draws" a box around the periphery of this character square. By rewriting lines 1710 through 1770, one could exploit this facility in many ways.

Listing 2 is the real performer this time. It will use the code of DATA lines 1400 through 1450 to draw four portholes as shown. Again the BASIC lines 1510 through 1560 could be written to draw the porthole(s) anywhere on the screen. If you study this code's disassembly in Figure B, you will find it uses the ROM's CIRCLE and DRAW routines found at 9862 (26B6 h) and 9965 (26ED h). By setting register A equal to the parameters we want and calling the ROM's integer stacking routine at 12518 (30E6 H) we circumvent the hassels of floating point.

```
D6D8 D5          PUSH DE
D6D9 E5          PUSH HL
D6DA 110000      LD DE,0000
D6DD 21FFD7      LD HL,D7FF
D6E0 E5          PUSH HL
D6E1 C5          PUSH BC
D6E2 F5          PUSH AF
D6E3 7A          LD A,D
D6E4 D5          PUSH DE
D6E5 CB67        BIT 4,A
D6E7 2018        JR NZ,D701
D6E9 CB5F        BIT 3,A
D6EB 2018        JR NZ,D703
D6ED 21E03F      LD HL,3FE0
D6F0 112000      LD DE,0020
D6F3 47          LD B,A
D6F4 04          INC B
D6F5 19          ADD HL,DE
D6F6 10FD        DJNZ,D6F5
D6F8 D1          POP DE
D6F9 1600        LD D,00
D6FB 19          ADD HL,DE
D6FC EB          EX DE,HL
D6FD F1          POP AF
D6FE C1          POP BC
D6FF E1          POP HL
D700 E9          JP (HL)
D701 CBA7        RES 4,A
D703 21E04F      LD HL,4FE0
D706 18E3        JR D6F0
D708 CB9F        RES 3,A
D70A 21E047      LD HL,47E0
D70D 18E1        JR D6F0
D70F ED53B05C    LD (nmia),DE
D713 E1          POP HL
D714 D1          POP DE
D715 C9          RET
```

Figure A

```
D6D8 010058      LD BC,5800
D6DB C5          PUSH BC
D6DC C1          POP BC
D6DD 79          LD A,C
D6DE C5          PUSH BC
D6DF CDE630      CALL 30E6
D6E2 C1          POP BC
D6E3 78          LD A,B
D6E4 C5          PUSH BC
D6E5 CDE630      CALL 30E6
D6E8 3E1C        LD A,1C
D6EA CDE630      CALL 30E6
D6ED CD8626      CALL 2686
D6F0 C1          POP BC
D6F1 79          LD A,C
D6F2 C5          PUSH BC
D6F3 CDE630      CALL 30E6
D6F6 C1          POP BC
D6F7 78          LD A,B
D6F8 C5          PUSH BC
D6F9 CDE630      CALL 30E6
D6FC 3E1E        LD A,1E
D6FE CDE630      CALL 30E6
D701 CD8626      CALL 2686
D704 C1          POP BC
D705 79          LD A,C
D706 D61A        SUB 1A
D708 4F          LD C,A
D709 78          LD A,B
D70A D60D        SUB 0D
D70C 47          LD B,A
D70D ED437D5C    LD (coor),BC
D711 C5          PUSH BC
D712 3E38        LD A,38
D714 CDE630      CALL 30E6
D717 3E11        LD A,11
D719 CDE630      CALL 30E6
D71C 3E03        LD A,03
D71E CDE630      CALL 30E6
D721 CDED26      CALL 26ED
D724 C1          POP BC
D725 79          LD A,C
D726 C607        ADD A,07
D728 4F          LD C,A
D729 78          LD A,B
D72A D608        SUB 08
D72C 47          LD B,A
D72D ED437D5C    LD (coor),BC
D731 C5          PUSH BC
D732 3E32        LD A,32
D734 CDE630      CALL 30E6
D737 3E12        LD A,12
D739 CDE630      CALL 30E6
D73C 3E02        LD A,02
D73E CDE630      CALL 30E6
D741 CDED26      CALL 26ED
D744 C1          POP BC
D745 ED437D5C    LD (coor),BC
D749 C5          PUSH BC
D74A 3E30        LD A,30
D74C CDE630      CALL 30E6
D74F 3E0C        LD A,0C
D751 CDE630      CALL 30E6
D754 3E02        LD A,02
D756 CDE630      CALL 30E6
D759 CDED26      CALL 26ED
D75C C1          POP BC
D75D 79          LD A,C
D75E C604        ADD A,04
D760 4F          LD C,A
D761 05          DEC B
D762 05          DEC B
D763 ED437D5C    LD (coor),BC
D767 C5          PUSH BC
D768 3E2E        LD A,2E
D76A CDE630      CALL 30E6
D76D 3E15        LD A,15
D76F CDE630      CALL 30E6
D772 3E02        LD A,02
D774 CDE630      CALL 30E6
D777 CDED26      CALL 26ED
D77A C1          POP BC
D77B D9          EXX
D77C 211628      LD HL,2816
D77F D9          EXX
D780 C9          RET
```

Figure B

```
1200 DATA 0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0
1210 DATA 213,197,229,245,217,8,
213,197,229,245,237,91,175,82,33
,255,5,25,235,42,93,92,1,2,0,9
1220 DATA 62,0,18,128,254,67,40,
4,254,99,32,6,62,1,18,35,24,241,
254,67,40,4,254,119,32,34,35,126
,214,49,203,95,32,92,71,198,4,16
,252
1230 DATA 213,229,213,33,8,0,25,
22,0,95,25,235,225,35,115,35,114
,225,209,24,33,254,60,40,4,254,1
12,32,54,35,126,214,49,203,87,32
,50,235,203,206,235
1240 DATA 71,193,2,16,252,213,22
9,213,33,42,0,24,208,35,126,254,
13,32,15,229,26,203,71,40,101,21
3,235,237,91,24,1,25,209,233,254
,61,40,78
1250 DATA 6,70,24,23,6,68,24,19,
6,69,24,15,6,71,24,10,6,72,24,6,
6,73,24,2,6,74,225
1260 DATA 78,62,0,205,48,18,62,6
9,215,62,82,215,62,82,215,62,79,
215,62,82,215,62,32,215,120,215,
62,4,215,121,203,111,40,1,215,20
5,9,32,56,251
1270 DATA 241,225,193,209,6,217,
241,225,193,209,201
1280 DATA 235,203,254,24,240,235
,203,246,24,235,235,203,238,24,2
30
```

Listing 3

```
1st 273 bytes CK TYPE report:

1200    :  409   :  8753
1210    :  242   :  11281
1220    :  358   :  15167
1230    :  385   :  16130
1240    :  357   :  16693
1250    :  236   :  8008
1260    :  373   :  16585
1270    :  109   :  5932
1280    :  148   :  8937
```

Next time we will examine rectangular windows and restoring things back to the screen. In the mean time, if you feel like getting a head start on code entry, type in listing 3. We'll be adding to it next time, so you'll need it eventually. If typing is too big a chore, I will send you a complete version of Windows & Portholes as advertised elsewhere in this magazine. (Windows & Portholes comes with BINGHAM's BEST for $12.95, or in a collection I call JAZZOFIRE (thats "jazzifier" in a drawl) for $9.95. For BINGHAM's Best owners I will send you Windows & Portholes on cassette for $3. Please write if you have any questions or comments to: Paul Bingham, PO Box 2034, Mesa, AZ 85214.

COMMENTS ON CK TYPE
by Paul Bingham

Stan Lemke wrote a great little 2069 program which appeared in the May/June '87 issue of TDM called CK TYPE. CK TYPE gives you a quick check of the listings you have typed in from TDM to see if you have made any errors. But so far, I've only seen Stan using it! Well, I intend to repent of this slothfulness on my part by including CK TYPE reports with each listing. This will help all the readers who type in my programs nip their entry problems in the bud.

I've also taken the liberty to condense Stan's BASIC version into a "one-liner". With a few tricks his whole program fit into one line (9999) and this can be easily MERGEd to a listing and RUN to give an evaluation. This "one line" version appears in Listing 1.1, and a report on itself is found in Figure 1.1. To do this self check, you will have to enter and run it as line 999 not 9999. It has an added facility to kip its own line 9999 in its evaluation. It also starts wanting you to enter the name of the program you are analyzing so it can properly title the output. I hope Stan won't mind me refining his little gem! And come on programmers, let's start using it!

```
short version CK TYPE report:

999     : 319   : 29480
```

Figure 1.1

Reader Survey

There is still time to send in your survey if you haven't already. We need your input to help plan future issues of TDM and to supply our advertisers with important data on service and products. Send this form or a copy to: Reader Survey, c/o TDM, 29722 Hult Rd., Colton, Oregon 97017.

#ABOUT YOU#

Name (optional):_____

Address (optional):_____

Age:_____ Male/Female:_____

Occupation:_____

What is your hobby: Part Time Computing

#ABOUT YOUR EQUIPMENT#

Computer you use the most: TS/1000 - mod - Rom.

Other computers you own: C-64

What printer(s) do you own: 2-2040's

What medium do you use to store data? Tape

What monitor(s) do you use: T.V.

Other equipment you own: 16K-Ram

Software package you use most: _____

Other software you use: Educational

What computer/hardware item are you planning on purchasing this year: _____

What software package are you planning on purchasing this year: _____

What hardware would you like to see developed for your computer: more Graphics

What software would you like to see developed for your computer: graphics / drawing

What one comment would you like to make about TS dealers and vendors (about service, advise, a gripe, a compliment, etc.): Let people know they are there. (Advertise)

#ABOUT TIME DESIGNS#

Most favorite section: Enjoy Everything

Least favorite section: _____

One particular article/program you really liked in a recent issue: Converting T/S 1000 to 64

If you could make one comment directly to the editor, what would it be: more articles - $ - Subscriptions on time -

Article/program you would like to see in an upcoming issue: Converting 2068 programs to TS/1000 Programs on tape

Suggestion of a topic for a "theme issue": _____

Do you know of any TS users who don't receive TDM? Would you be willing to supply their names and addresses? Do you have a suggestion on how we could gain more subscribers? _____

```
9999 INPUT k$: LPRINT k$;" CK TY
PE report:": LET d=256: LET g=
23636: LET b=d*PEEK g+PEEK (g-1)
: FOR h=1 TO g*2: LET e=0: LET f
=d*PEEK b+PEEK (b+1): IF f<>9999
 THEN LET a=d*PEEK (b+3)+PEEK (b
+2): LET b=b+4: LET j=1: FOR i=1
 TO a: LET e=e+(j+1)*PEEK b: LET
  j=NOT j: LET b=b+1: NEXT i: FOR
 c=2 TO 3: PRINT #c;f;TAB 8;": "
;a;TAB 16;": ";e: NEXT c: NEXT h
```

Listing 1.1

TS2068 DROP DOWN MENUS

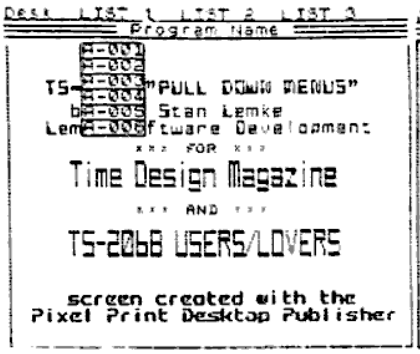
Stan Lemke

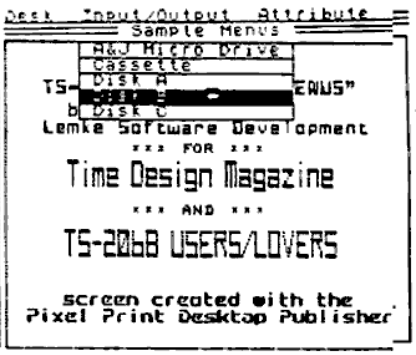
One of the advantages the newer, bigger computers like the ATARI ST and AMIGA have over the TS2068 class of computers is the "User Interface" that their bigger memory and high speed affords them...specifically, such things as a mouse to sweep a cursor around the screen, and a really nice menu structure that "drops down" onto the screen when your cursor touches the menu line, and then magically disappears when you make your selection. This allows your screen to be free of most of the menu until you need it. Even then, by planning your menu layout correctly, you can show just the items the user wants for a specific operation and be able to describe the selections more fully than with the usual short word (at most), or a single letter as is more often the case.

Well, with all these advantages to "drop-down" menus, I decided to see what I could do as far as creating a TS2068 drop-down menu utility. The following program is just that, a general drop-down menu utility that will allow others to create (very easily) the type of menus found on the more expensive computers. It is also a neat little demo program that allows those who have not seen these menus in operation to get a feel of what they are like.

The utility displays 2 lines at the top of the screen, the first has a list of menu (header) topics, the second displays the program title/name. Using the LEFT joystick, the user moves a small arrow UDG sprite around on the screen. When the arrow cursor is placed on any of the menu headers, a set of menu options drops down onto the screen below that menu header. As the cursor is moved over the options, each turns INVERSE VIDEO...and then TRUE VIDEO when the cursor moves off that option. Pressing the fire button activates the selection. Moving the cursor off of the menu options (and pressing FIRE) removes the menu list, and replaces the original screen.

The menu headers and options are defined in DATA statements, in lines 9005 thru 9025. In the demo, when the DESK option is selected, a Copyright message about the program is displayed (see line 9440). This Copyright message can be user-defined...up to 3 lines and 23 characters per line. 3 more menu headers can be placed on the top line. Note: You must be careful designing these headers, as the program places two spaces between the header strings. One of these may be a "null string" (empty, two apostrophies placed side-by-side, indicating no more headers).





Menu selection are defined using DATA statements in lines 9015, 9020, and 9025. Six selections are available for each header, with the option of using null (empty) strings as above, to indicate no more selections.

Let's take a look at the program listing. The program is set up ready to be compiled with TIMACHINE (from Novelsoft). The program will work just as it is in BASIC too. Program execution begins at line 9000. Lines 9000 to 9090 are program initialization.

Listing A is a copy of the BASIC program in demo form. The TIMACHINE compiler directives are already set up so you can compile the demo. Although the program will work in BASIC, it is S-L-O-W!

Following the program listing is the CK-TYPE output for debugging the program (Listing B..see the May/June '87 issue of TDM). Listing C is the TIMACHINE output. Listing D is an excerpt from a sample menu that shows how to set up a 2 header menu.

Other Program Notes: Line 9066 contains the bytes for the arrow cursor UDG. Lines 9290 to 9360 perform the cursor movement. Line 9355 contains a PAUSE 4 to control cursor speed.

I hope you enjoy playing with this demo, and maybe someday we'll see some TS2068 programs using real drop down menus.

Listing A

```
8000 REM ************************

   TS 2068  Drop-down Menu
   (C)   by  S D Lemke
  Lemke Software Development
       2144 White Oak
    Wichita,  KS.   67207

*********************************

8800 REM ! INT A(),B(),C(),D(),E(
),I,J,SET,MENU,ITEM,ROW,COL,LROW
,TOP,BOT,LFT,RIT,S,BUT,ADD
8810 REM ! LIST
8820 REM ! LPRINT
8900 REM ! OPEN #
8999 REM ************************

LINES 9000 - 9090 INITIALIZATION

*********************************

9000 DIM a(18): DIM b(19): DIM c
(4): DIM d(3): DIM e(3): DIM s$(
2080): PAPER 7: INK 0: BORDER 1:
 CLS
9004 REM [illegible]
9005 DATA "LIST 1","LIST 2","LIS
T 3"
```

```
9009 REM [illegible]
9010 DATA "  Program Name  "
9014 REM [illegible]
9015 DATA "A-001","A-002","A-003
","A-004","A-005","A-006"
9020 DATA "B-001","B-002","B-003
","B-004","B-005","B-006"
9025 DATA "C-001","C-002","C-003
","C-004","C-005","C-006"
9029 REM [illegible]
9030 LET M$="Desk": LET c(1)=6
FOR i=2 TO 4: LET C(I)=0: READ a
$: IF LEN A$ THEN LET c(i)=c(i-1
)+LEN a$+2: LET M$=M$+"  "+a$
9032 IF C(I)>31 THEN LET C(I)=31
9033 IF LEN M$>32 THEN LET M$=M$
(1 TO 32)
9035 NEXT I: READ T$
9040 LET b(1)=0: LET O$="": FOR
i=1 TO 18: READ a$: LET a(i)=LEN
 a$: LET b(i+1)=b(i)+a(i): LET O
$=O$+a$: NEXT i
9045 FOR i=1 TO 5: IF a(i)>d(1)
THEN LET d(1)=a(i)
9050 IF a(i+6)>d(2) THEN LET d(2
)=a(i+6)
9055 IF a(i+12)>d(3) THEN LET d(
3)=a(i+12)
9060 NEXT i: LET e(1)=c(1)+d(1):
 LET e(2)=c(2)+d(2): LET e(3)=c(
3)+d(3)
```

```
9064 REM [illegible]
9066 DATA INT 0,16,32,127,127,32
,16,0
9070 FOR i=0 TO 7: READ j: POKE
USR "a"+i,j: NEXT i
9090 LET ROW=7: LET COL=16: LET
MENU=0: LET b$="
                ": GO TO 9150
9095 REM ************************

   MENU PRINT/DRAW SUBROUTINES

*********************************

9099 REM [illegible]
9100 PRINT AT 0,0,M$: PLOT 0,168
: DRAW 255,0: PLOT 0,165: DRAW 2
55,0: PLOT 0,162: DRAW 255,0: PL
OT 0,159: DRAW 255,0: PRINT AT 1
,(31-LEN T$)/2;T$: RETURN
9109 REM [illegible]
9110 PRINT AT 2,0; OVER 1; INVER
SE 1;" About this program. ": RE
TURN
9119 REM [illegible]
9120 FOR i=1 TO 6: IF a(i) THEN
PRINT AT i+1,c(i);O$(b(i)+1 TO b
(i)+a(i)): PLOT 8+c(i)-1,167-i*8
: DRAW 0,-8: DRAW d(i)+8,0: DRAW
 0,8: DRAW -d(i)+8,0: NEXT i
9125 RETURN
9129 REM [illegible]
9130 FOR i=1 TO 6: LET J=I+6: IF
 a(J) THEN PRINT AT i+1,c(2);O$(
b(J)+1 TO b(J)+a(J)): PLOT 8+c(2
)-1,167-i*8: DRAW 0,-8: DRAW d(2
)*8,0: DRAW 0,8: DRAW -d(2)*8,0:
 NEXT i
9135 RETURN
```

```
9139 REM [illegible]
9140 FOR i=1 TO 5: LET j=i+16: I
F a(j) THEN PRINT AT i-1,c(3),0$
(b(j)+1 TO b(j)+a(j)): PLOT 8*c(
3)-1,167-i*8: DRAW 0,-5: DRAW d(
3)*8,0: DRAW 0,8: DRAW -d(3)*8,0
: NEXT i
9145 RETURN
9148 REM **********************

 MAIN CONTROL LOOP ++++++
    ENTER HERE TO SELECT AN ITEM

  SELECTION RETURNED IN "ITEM"
     0 = NO SELECTION (CANCEL)
  1 - 10 = ITEM/MENU SELECTED

*******************************

9149 REM ! OPEN #
9150 GO SUB 9100: PLOT 0,159: DR
AW 0,-159: DRAW 255,0: DRAW 0,15
9
9151 GO SUB 9180: FOR i=0 TO 7:
POKE (USR "C"+i),PEEK (add+i+256
): NEXT i
9155 PRINT AT ROW,COL;"■"
9160 GO TO 9200
9170 REM [illegible]
9180 LET add=15384+2048+INT (ROU
/8)*32+(ROW-8*INT (ROW/8))+COL:
RETURN
9190 REM [illegible]
9200 LET S= STICK (1,1): IF S TH
EN GO SUB 9300: REM [illegible]
9210 IF MENU THEN GO TO 9400
9220 GO TO 9200
9230 REM [illegible]
9235 REM [illegible]
9240 FOR i=0 TO 2079: POKE (6303
1+I),PEEK (i+16384): NEXT i: RET
URN
9245 REM [illegible]
9250 FOR i=0 TO 2079: POKE (i+16
384),PEEK (63031+I): NEXT i: RET
URN
9290 REM [illegible]
9300 GO SUB 9180: PRINT AT ROW,C
OL;"■": REM [illegible]
9310 IF S)=8 AND S(=10 THEN LET
COL=COL+(COL(=30)
9320 IF S)=4 AND s(=6 THEN LET C
OL=COL-(COL)=1)
9325 IF S=1 OR s=5 OR s=9 THEN L
ET ROW=ROW-(ROW)=1)
9330 IF S=2 OR s=6 OR s=10 THEN
LET ROW=ROW+(ROW(=6)
9340 GO SUB 9180: FOR i=0 TO 7:
POKE (USR "C"+i),PEEK (add+i+256
): NEXT i: REM [illegible]
9350 PRINT AT ROW,COL;"■": IF RO
W=0 THEN LET MENU=1
9355 PAUSE 4: REM [illegible]
9360 RETURN
9399 REM [illegible]
9400 IF COL)=c(1) AND COL(c(2)-2
 THEN PRINT AT ROW,COL;"■": GO S
UB 9240: PRINT AT 0,c(1); INVERS
E 1; OVER 1;b$(1 TO c(2)-c(1)-2)
: GO SUB 9120: LET TOP=2: LET BO
T=i: LET LFT=c(1): LET RIT=c(1)-
1: LET SET=0: LET ITEM=1: GO TO
9500
9410 IF COL)=c(2) AND COL(c(3)-2
 THEN PRINT AT ROW,COL;"■": GO S
UB 9240: PRINT AT 0,c(2); INVERS
E 1; OVER 1;b$(1 TO c(3)-c(2)-2)
: GO SUB 9130: LET TOP=2: LET BO
T=i: LET LFT=c(2): LET RIT=c(2)-
1: LET SET=0: LET ITEM=7: GO TO
9500
9420 IF COL)=c(3) AND COL(c(4)-2
 THEN PRINT AT ROW,COL;"■": GO S
UB 9240: PRINT AT 0,c(3); INVERS
E 1; OVER 1;b$(1 TO c(4)-c(3)-2)
: GO SUB 9140: LET TOP=2: LET BO
T=i: LET LFT=c(3): LET RIT=c(3)-
1: LET SET=0: LET ITEM=13: GO TO
 9500
9425 IF COL)3 THEN LET MENU=0: G
O TO 9200
9430 PRINT AT ROW,COL;"■": GO SU
B 9240: PRINT AT 0,0; INVERSE 1;
 OVER 1;"          ": GO SUB 9110: PLO
T 39,144: DRAW 185,0: DRAW 0,-25
: DRAW -185,0: DRAW 0,25
9440 PRINT AT 4,5;"
          ": PRINT AT 5,5,"© Lem
ke Software (1987)": PRINT AT 6,
5;"                ": REM
[illegible]
9450 BEEP .01,20: PAUSE 0: GO SU
B 9250: LET MENU=0: LET ROW=10:
LET COL=16: GO TO 9151
9499 REM [illegible]
9500 LET S=0: INVERSE 1: GO SUB
9300: INVERSE 0
9501 LET S= STICK (1,1): LET BUT
= STICK (2,1): IF BUT THEN GO TO
 9600
9502 IF NOT S THEN GO TO 9501
9505 LET LROW=ROW: GO SUB 9300.
IF LROW=ROW THEN GO TO 9501
9507 IF SET THEN PRINT AT LROW,L
FT; OVER 1; INVERSE 1;b$(1 TO RI
T-LFT+1)
9510 LET SET=0: IF (ROW)=TOP AND
 ROW(=BOT) AND (COL)=LFT AND COL
(=RIT) THEN LET SET=1
9515 IF NOT SET THEN GO TO 9501
9520 PRINT AT ROW,LFT; OVER 1; I
NVERSE 1;b$(1 TO RIT-LFT+1)
9530 GO TO 9500
9600 LET SET=0: IF (ROW)=TOP AND
 ROW(=BOT) AND (COL)=LFT AND COL
(=RIT) THEN LET SET=1
9605 LET ITEM=(ITEM+ROW-TOP)+SET
: LET MENU=0: LET SET=0: GO SUB
9250: LET ROW=7: LET COL=16
9610 PRINT #0;AT 0,0;"ITEM SELEC
TION = #";ITEM;TAB 30; GO TO 915
1: REM [illegible]
9998 STOP
9999 SAVE "DROP MENU": SAVE "DRO
P MENU"CODE 57316,4557
```

Listing B

```
8000    286    21932
8800     80     8093
8810      4      994
8820      1      962
8900      4      935
8999    154    10138
9000    107     7573
9004     24     2535
9005     26     2690
9009     21     1819
9010     18     2356
9014     31     3578
9015     49     3862
9020     49     3874
9025     49     3886
9029     25     2930
9030    119    10040
9032     30     2442
9033     39     3142
9035      7     1132
9040     98     8524
9045     53     4163
9050     50     3218
9055     52     3424
9060    105     5606
9064     19     1990
9066     74     3163
9070     35     3931
9090     91     8285
9095    154    10253
9099     26     2430
9100    211    13002
9109     24     3206
9110     62     6520
9119     27     3258
9120    218    12218
9125      2      521
9129     27     3259
9130    231    14177
9135      2      521
9139     27     3260
9140    232    13131
9145      2      521
9148    314    22342
9149      4      936
9150     89     5682
9151     63     5755
9155     14     1840
9160     12     1315
9170     25     2503
9180     87     5763
9190     22     2880
9200     63     5716
9210     18     2374
9220     12     1315
9230     29     3414
9235     29     2588
9240     51     5374
9245     24     2447
9250     51     5526
9290     20     2060
9300     47     5345
9310     46     4533
9320     44     4501
9325     54     4792
9330     55     4718
9340     31     7585
9350     41     4247
9355     41     3673
9360      2      521
9399     28     3218
9400    257    18689
9410    257    18740
9420    258    19018
9425     39     3340
9430    177    11043
9440    166    12194
9450     95     6851
9499     23     2886
9500     41     2869
9501     63     4819
9502     16     1967
9505     44     5141
9507     62     6579
9510     63     7975
9515     18     2204
9520     56     4365
9530     12      899
9600     63     7975
9605     91     7883
9610    158    13365
9997      4      938
9998      2      465
9999     49     4957
```

Listing C

```
LINE 8900:  +0
LINE 9149:  +1779
LINE 8900:  57316 #DFE4
LINE 9149:  59095 #E6D7

RT1       61192 #EF08
RT2       61193 #EF09
RT7       61206 #EF16
RT8       61211 #EF1B
RT9       61212 #EF1C
RT10      61221 #EF25
RT11      61230 #EF2E
RT12      61231 #EF2F
RT13      61240 #EF38
RT14      61246 #EF3E
RT15      61247 #EF3F
RT16      61256 #EF48
RT18      61262 #EF4E
RT19      61270 #EF56
RT20      61271 #EF57
RT21      61279 #EF5F
RT30      61287 #EF67
RT32      61293 #EF6D
RT36      61299 #EF73
RT37      61304 #EF78
RT39      61321 #EF89
RT47      61348 #EFA4
RT48      61360 #EFB0
RT49      61372 #EFBC
RT50      61388 #EFCC
RT55      61400 #EFD8
RT61      61409 #EFE1
RT62      61453 #F00D
RT64      61464 #F018
RT69      61472 #F020
RT70      61488 #F030
RT71      61496 #F038
RT87      61502 #F03E
RT89      61531 #F05B
RT91      61542 #F066
RT93      61550 #F06E
RT96      61556 #F074
RT104     61563 #F07B
RT110     61603 #F0A3
RT111     61608 #F0A8
RT112     61616 #F0B0
RT114     61629 #F0BD
RT116     61640 #F0C8
RT117     61646 #F0CE
RT120     61652 #F0D4
RT121     61658 #F0DA
RT122     61664 #F0E0
RT123     61672 #F0E8
RT124     61679 #F0EF
RT126     61684 #F0F4

i.........  INTEG    61873 #F181
j.........  INTEG    61875 #F183
set.......  INTEG    61877 #F185
menu......  INTEG    61879 #F187
item......  INTEG    61881 #F189
row.......  INTEG    61883 #F18B
col.......  INTEG    61885 #F18D
lrow......  INTEG    61887 #F18F
top.......  INTEG    61889 #F191
bot.......  INTEG    61891 #F193
lft.......  INTEG    61893 #F195
rit.......  INTEG    61895 #F197
s.........  INTEG    61897 #F199
but.......  INTEG    61899 #F19B
add.......  INTEG    61901 #F19D
a(18)       INTEG    61907 #F1A3
b(19)       INTEG    61943 #F1C7
c(4)        INTEG    61981 #F1ED
d(3)        INTEG    61989 #F1F5
e(3)        INTEG    61995 #F1FB
a$          STR(255) 62001 #F231
b$          STR(255) 62258 #F332
h$          STR(255) 62515 #F433
o$          STR(255) 62772 #F534
s$(2080)    STR      63029 #F635
t$          STR(255) 65111 #FE57

TIME MACHINE ©1986 Cameron Mayne

M/C  4557 BYTES
+ 3495 BYTES FOR M/C VARIABLES
(BASIC WAS 6726 BYTES)

SAVE "m/c"CODE 57316,4557
LOAD "m/c"CODE 57316
```

Listing D

```
9004 REM [illegible]
9005 DATA "Input/Output","Attrib
ute",""
9009 REM [illegible]
9010 DATA " Sample Menus "
9014 REM [illegible]
9015 DATA "  A&J Micro Drive  ","
Cassette       "," Disk A
     "," Disk B
     "," Disk
 C
9020 DATA " Paper  "," Ink
" Border "," Bright
9025 DATA "
```

REVIEW THE TS2068 AND THE COMMODORE 1520 PLOTTER

reviewed by Frank Davis

Something I have really missed, not being able to do with my TS2068 is using it with a plotter. This was most unfortunate as I had used one on an earlier system I owned...a VIC20 (by Commodore). I had used a 1520 Color Plotter Printer. I was at the point of working out the problem of interfacing the rather unusual serial port on the Commodore 1520, when I picked up a magazine and found an ad for an interface and software to run the plotter on the Timex Sinclair TS2068. I sent for some information and very shortly had the kit in my hands to begin the task. NOTE: Get the kit if you know what you are doing and are not rusty at the soldering iron...otherwise order the completed interface.

The Commodore 1520 uses paper slightly wider than that used by the TS2040 printer, but not the standard 8" (it is under 5"). However, it is regular paper and is available from Commodore, Radio Shack and many Atari dealers. They also carry the four colored pens used in the plotter. All of these brands made a similar plotter, and each set up to interface with their particular computer. The colors are black, blue, red and green. In all the years I have had this plotter, I have had but one problem with it...a small plastic gear coming loose and not being able to turn the other gears to move the paper back and forth. A small amount of super glue gel seems to have cured this. If you ever have to do this be careful not to get any in the grooves of the gear itself.

The graphics you can do with this interface and the available software for it is by no means limited. John McMichael, the designer of the interface and the programmer does not skimp on features. The Driver program that comes with the interface contains a very extensive demo of just what can be expected of this combo. You can also examine the demo program, but not copy it to the 2040 printer or LLIST it. You can also clear out the BASIC (except Line 10 which you will need to load the machine code) and use this driver for your own programs. This is a better deal than I got from Commodore when I purchased the plotter originally, it had no ready to run program with it, no driver...only a manual with a few short sample programs of which all but two of them contained errors in the programs.

Other software available for this interface include the Following: A) SCREEN-TO-PLOTTER, which allows you to use the plotter like a connect the dots, by use of the cursor or a joystick, use text, save screeens or load in previously saved screens and edit them, all in four colors. When using text you have many choices, such as solid lines or dashed lines, size of print, character rotation, centering. To change colors in pictures or text is as simple as hitting the letter "c" or changing pages by use of the letter "P". This is a user friendly program.

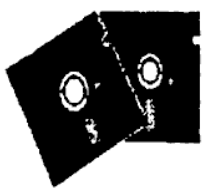
B. CMS 1520, is a program which allows you to combine Customized MSCRIPT V5 or V5.2 and the 1520. This allows the use of the 1520 as an 80 column printer in color and the use of all of the 1520 functions in a text file.

C. PIC-PLOT which allows you to do a dump of a screen to the 1520 in two sizes. You can select one color for the small plot and two colors for the larger plot. It also allows you to put colored captions or sub-titles below the pictures.

D. BANNERIFIC, a program that allows you to use the 1520 to make colored banners. You may plot up to two hundred characters using the special UDGs that come with the program, or use those of the ROM set. It has 58 selectable character sizes and each character can be whatever color you assign it. The banner may have the characters designed either as vertical or horizontal, and the characters may be inversed or done as an over character. You can select proportional spacing or not. The only thing missing here was the option to fill in the character or not to fill. It should be easy to use your own UDG's with this program.

The 1520 is an ORPHAN in its own right. It is no longer available from Commodore in the U.S. I have seen some ads for it in some British Mags...along with the VIC20, still being offered for sale. This means that you first need to get one before you invest in this nifty interface and software. They are available at many TOY-R-US stores across the nation for $30 to $40 (not bad whin I think of the $199 many people paid). You might just check a local Commodore Users group to see if someone wants to let go of one. Also check your local Commodore Dealer to see if he still can get you one. I saw used ones for sale at each of the computer and ham shows I went to this last year. They were also being offered for $49.95 + $3 S&H by ALL ELECTRONICS CORP., PO Box 20406, Los Angeles, CA 90006, 1-800-826-5432.

To get more information about this interface and the software, write to: John McMichael, 1710 Palmer Drive, Laramie, WY 82070.



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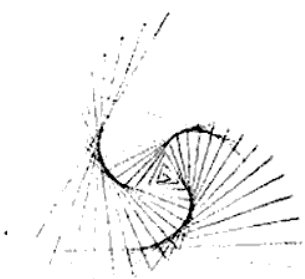

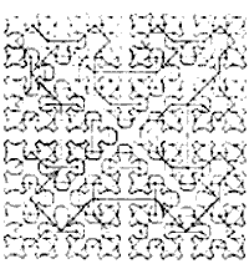

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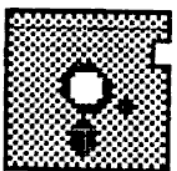

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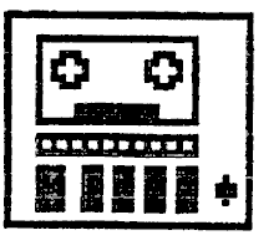

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Z-COLUMN

The "Z-COLUMN" is a new and regular (hopefully) feature of *TIME DESIGNS*. We will cover news and helpful tidbits of information for the Z88 Laptop Computer...the newest addition to the Sinclair family tree. On occaison, we may also accompany this column with an article or product review.

What better way to kick off a new column than to make a major announcement! Yes, that's right...just as Cambridge Computer (Sir Clive's new company) promised...the Z88 has passed the FCC test, and is now available here in the U.S.!

While some details were sketchy at press time, we do know that Cambridge Computer has signed a deal with a U.S. distributor, and that the new computers are being assembled by SCI in Huntsville, Alabama, with foreign parts. SCI is a U.S. based corporation that has worldwide concerns, and is in fact manufacturing the European Z88 for Cambridge, in a Scotland factory.

The U.S. Z88 is reported to have an updated ROM. It also has a steeper retail price than what most of us anticipated...$549.90. No getting around this, the weak dollar has driven prices up. (In fact all personal computers are going up in price for the first time in years. And Japaneese RAM chips are once again expensive.) Some folks will certainly shy away from the price, but this is the most powerful (for its size and weight) laptop computer currently on the market.

1/2 Meg RAM cartridges are now available for right around $400. With three of them installed, it gives the user 1 1/2 Meg to play with "on the go". The 1 Meg. cartridges, are still supposed to be released in a couple of months.

Lots of third-party support taking off now in Europe. Here are a few of the most recent developments:

Z-TERM is a new telecommunications package (a U.S. version is available) that supports XMODEM, it autodials, and can drive virtually any modem, including the new miniature Z88 modem from *Miracle Systems*.

Cummanah will have their disk drive interface (with RGB monitor output) available soon for $199. It works similar to the Radio Shack floppy drive system for the Model 100.

Focus Magazines (the publishers of *QL WORLD Magazine*, will launch their new Z88-specific magazine this month.

The *Z88 Users' Club* of Great Britain has formed, and already has four club newsletters published, called the *Z88 EPROM*. For further information, write to: Roy Woodward, 68 Wellington Street, Long Eaton, Nottingham, England NG10-4NG. (Thanks to Larry Chavarie of Canada for supplying this information.)

While I attended the *SUNSTATE TS WINTERFEST* in Orlando, Florida, I had the privilege of meeting *Stan Veit*, who is the Publisher/Owner/Editor-in-Chief of *COMPUTER SHOPPER*. While Mr. Veit had attended the *Fall Comdex* in Las Vegas, a representative from Cambridge gave him a Z88 for review (see the March '88 issue of Computer Shopper). Stan uses the Z88 as his "electronic notebook" wherever he goes. Now here is someone who has access to virtually any PC or laptop...and actually prefers the Z88 for some applications over the others. He mentioned that the "silent keyboard" is a big plus in conferences.

Well, no doubt, many of you are skeptical about this new computer, and the price alone will drive a big share of the "hardcore" Sinclair types away. But nevertheless, this is an excellent laptop computer, and the finest computer for Sir Clive to date. It's not another Sinclair "Boondoggle" (as one newsletter editor called it...yet admitted he had never used one before). While at the Florida Winterfest, the same comment was heard time, and time again at the *SHARP'S* booth: "This is what the QL *should* have been!" (I'm not knocking the QL though, as it does have merits of its own.)

Sir Clive himself is very serious about this computer, and wants to insure its success. *Bryan Davies*, a columnist for *QL WORLD*, recently told me on the phone, that the last *MICROFAIR* (a trade show open to the public) he attended, found Sir Clive up on the stands demonstrating the little "Z" to attendees.

That's about it for this issue. Hope to be back next issue with more stuff. Until then, you can send a S.A.S.E. to me in care of *TIME DESIGNS*, and I'll send you some info on a user group starting up here in North America. (If you have already sent your envelope...I will fianlly have responded to your request by the time you read this--promise!).

_ Tim Woods

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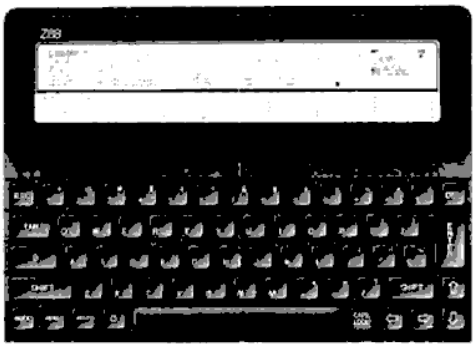

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FINAL LESSON

by Syd Wyncoop

This is it folks. I leave it to you to progress from here. There are many other instructions I could have discussed, such as CP (Confuse Programmer), but they will be discovered soon enough, without my assistance.

As a wrap-up to this series, I present a special treat...a full fledged MC program. Additionally, it is written to support the many CP/M systems which are running on our humble "doorstops". Those of you without CP/M will need to replace all the calls to CP/M's BDOS with your own routines. I have provided the necessary PRINTing and INPUTing routines in previous lessons.

As usual, the program is presented as a source file, to allow for easy modification by you. The "DATA STORAGE" area is where your customization takes place. The menus and messages can be changed to suit your taste but it is generally best to assemble the program prior to making changes.

Next, and most important, are the printer command tables. These must be changed to reflect your printer commands. All entries are four bytes long and the fourth byte must contain OFFh. Your printer manual will provide the necessary entries for these tables.

As the program is self-explanatory and fairly long, let's get to it!

Printer Set-Up Program

Written for CP/M and the Epson FX-286
by Syd Wyncoop, S & K Enterprises

Operation: The printer is cleared of all prior settings by sending the printer its start-up initialization code first, followed by your selected options. A bell will sound to let you know the settings have been properly received by the printer. The printer must be turned on, or your system may hang-up. If it hangs, you need only turn on the printer to get things working properly.

In the interest of brevity, there is no documentation, save this source. The comments and labels should prove to be self-explanatory. All customization is done in the tables and/or program defines, prior to assembly.

There is minimum of error checking. If the program will be used by an inexperienced user or employee, you may wish to trap a few additional errors to avoid a crash.

Follow the prompts. You may press ENTER at most of them to either accept a default value or skip selection...the choice will be obvious.

This program is donated to the CP/M Public Domain. Please feel free to modify and use it for your own purposes. I hope you find it of use. In any event, Have Fun!

```
;::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
;
;Vers   1.0,    Rev 0
;
;Program Defines:
;----------------
bell            equ 07h         ;ascii bell
bs              equ 08h         ;ascii backspace
lf              equ 0Ah         ;ascii linefeed
ff              equ 0Ch         ;ascii formfeed, your terminal may need
                                ;a series of linefeeds instead of a ff
cr              equ 0Dh         ;ascii carriage return
esc             equ 1Bh         ;ascii escape code
bdos            equ 0005h       ;entry to CP/M functions
warm_boot       equ 0000h       ;re-entry to CP/M CCP
;
;::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
;                       MAIN  PROGRAM
;::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
                org 100h        ;standard TPA
;
start           ld hl,init_tbl  ;get pointer to printer initialization
                call fil_prt_bf ;and pre-load print buffer with it
style           call prt_style  ;print style selection menu
get_style       call get_num    ;get menu selection
                jr c,skp_style  ;if no selection, skip ahead
                cp 1dh          ;check if in valid range (<=28)
                jr nc,get_style ;else, reject it
                ld hl,style_tbl ;base of style selection table
                add hl,bc       ;add the offset for table entry
                call fil_prt_bf ;and move table entry to print buffer
skp_style       call prt_again? ;print select again message
                jr z,style      ;go get another selection
                call prt_done?  ;print exit message
                jp z,ring_bell  ;and exit if requested
;
ttype           call prt_type   ;print type selection menu
get_type        call get_num    ;get menu selection
                jr c,skp_type   ;if no selection, skip ahead
                cp 9            ;check if offset in valid range (<=8)
                jr nc,get_type  ;else, reject it
                ld hl,type_tbl  ;base of type selection table
                add hl,bc       ;add the offset for table entry
                call fil_prt_bf ;and move table entry to print buffer
skp_type        call prt_again? ;print select again message
                jr z,ttype      ;go get another selection
                call prt_done?  ;print exit message
                jr z,ring_bell  ;and exit if requested
;
left_margin     call prt_heading ;clear screen and print heading
                ld de,l_marg_inq ;point to left margin prompt
                ld c,9          ;print string$ function
                call bdos       ;print left margin prompt
                call dec_inpt   ;get a decimal number
                ld (left_marg),a ;load new value into table entry
                ld hl,lmarg_tbl ;get left margin table entry
                call fil_prt_bf ;and move it to the print buffer
;
rght_margin     ld de,r_marg_inq ;point to right margin prompt
                ld c,9          ;print string$ function
                call bdos       ;print right margin prompt
get_rght        call dec_inpt   ;get a decimal number
                jr c,dflt_rmarg ;assume default value
                ld a,(left_marg) ;minimum margin error check
                cp e            ;is right value > left value?
                jr c,valid_r_m  ;accept valid entry
                call prt_errmsg ;else, print error message
                jr get_rght     ;and get another input
valid_r_m       ld a,e          ;retrieve value
                jr rmarg_ok     ;skip ahead w/valid entry
dflt_rmarg      ld a,80         ;else, load default value
rmarg_ok        ld (rght_marg),a ;store value in table
                ld hl,rmarg_tbl ;get right margin table entry
                call fil_prt_bf ;and move it to the print buffer
;
page_length     ld de,pg_len_inq ;point to page length prompt
                ld c,9          ;print string$ function
                call bdos       ;print page length prompt
                call dec_inpt   ;get a decimal number
                jr c,skp_perf   ;accept default value of 66 lines
                ld (page_len),a ;store value in table
                ld hl,pglen_tbl ;get page length table entry
                call fil_prt_bf ;and move it into the print buffer
;
skp_perf        ld de,skip_perf? ;point to skip perforation prompt
                ld c,9          ;print string$ function
                call bdos       ;print skip perforation prompt
                call get_yn     ;go get response
                jr nz,ring_bell ;exit if no
num_lines       ld de,skp_nlines ;else, point to # of lines prompt
                ld c,9          ;print string$ function
                call bdos       ;ask how many lines to skip
                call dec_inpt   ;get a decimal number
                jr nc,nlines_ok ;skip ahead w/valid entry
                ld a,6          ;else, set default at 6
nlines_ok       ld (skp_nline),a ;store value in table entry
                ld hl,skip_tbl  ;get skip lines table entry
                call fil_prt_bf ;and move it into the print buffer
;
ring_bell       ld hl,bell_tbl  ;store a few bell rings
                call fil_prt_bf ;in the print buffer
                ld (hl),0FFh    ;lastly, store a terminating byte
;
send_2_prtr     ld hl,prt_buffer ;get the start of the print buffer
send_lp         ld a,(hl)       ;and check each byte
                cp 0FFh         ;have we found the last byte yet?
                jr z,end_send   ;if so, exit loop
                ld e,(hl)       ;else, send it to the printer
                ld c,5          ;with the list output function
                push hl         ;but, save our pointer first
                call bdos       ;ok, send it
                pop hl          ;retrieve the print buffer pointer
                inc hl          ;and adjust it for next byte
                jr send_lp      ;stay in loop until done
end_send        ld de,all_done  ;point to finished message
                ld c,9          ;print string$ function
                call bdos       ;print message to let the dumb human
                                ;know we are finished
exit            jp warm_boot    ;and return to CP/M
;
;::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
;                       SUBROUTINES
;::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
;-------------------------------
;       Print Menu Heading
;-------------------------------
;Inputs:none
;
;Outputs:CRT is cleared and menu heading printed in preparation for the
;        rest of the selection panel.
;
prt_heading     ld de,heading   ;initialize pointer for CPM
                ld c,9          ;print string$ function
                jp bdos         ;go do it
```

```
;-------------------------------
;       Print Style Menu
;-------------------------------
;Inputs:none
;
;Outputs:Print style selection panel is sent to CRT
;
prt_style       call prt_heading ;clear CRT and print heading
                ld de,style_menu ;initialize pointer for CPM
                ld c,9           ;print string$ function
                jp bdos          ;go do it
;-------------------------------
;       Print Type Menu
;-------------------------------
;Inputs:none
;
;Outputs:Print type selection panel is sent to CRT
;
prt_type        call prt_heading ;clear CRT and print heading
                ld de,type_menu  ;initialize pointer for CPM
                ld c,9           ;print string$ function
                jp bdos          ;go do it
;
;-----------------------------------
;       Print Another Selection?
;-----------------------------------
;Inputs:none
;
;Outputs:Print another selection message
;
prt_again?      ld de,another?   ;initialize pointer for CPM
                ld c,9           ;print string$ function
                call bdos        ;go do it
                jp get_yn        ;get response
;
;-----------------------------
;       Print Done Yet?
;-----------------------------
;Inputs:none
;
;Outputs:Print are we done enquiry
;
prt_done?       ld de,done_yet? ;initialize pointer for CPM
                ld c,9          ;print string$ function
                call bdos       ;go do it
                jp get_yn       ;get response
;
;-------------------------------
;       Fill Print Buffer
;-------------------------------
;Inputs:HL = address of the table entry to be moved to print buffer
;
;Outputs:none
;
fil_prt_bf      ex de,hl        ;move pointer to DE
                ld hl,(buf_ptr) ;retrieve print buffer pointer
fill_loop       ld a,(de)       ;get byte to put in print buffer
                cp 0FFh         ;and check for terminating byte
                jr z,end_fill   ;exit loop if found
                ld (hl),a       ;else, move it to print buffer
                inc hl          ;and adjust pointers
                inc de
                jr fill_loop    ;stay in loop until done
;
end_fill        ld (buf_ptr),hl ;store print buffer pointer for next move
                ret
;
;-----------------------------
;       Get Y/N Response
;-----------------------------
;Inputs:none
;
;Outputs:A = 0 if yes or if cr
;        A = 'N' if no
;
get_yn          call direct_io  ;get y/n response
                cp 'Y'          ;was it yes?
                jr z,yes        ;go set zero flag
                cp cr           ;was it a cr?
                jr z,yes        ;go set zero flag
                cp 'N'          ;was it no?
                jr nz,get_yn    ;do again, was not valid input
                and a           ;clear zero flag
                ret             ;A = 'N'
                jr get_yn       ;do again, was not valid input
yes             xor a           ;indicate yes or cr
                ret
```


TS·2068 UP·DATE
the user's NEWS

TS-2068 UP-DATE
1317 STRATFORD AVE.
PANAMA CITY, FL 32404

TS-2068 UP-DATE is a quarterly publication devoted to the support of users of the Timex TS-2068. Each of the Disk Drive Systems for the TS-2068 are discussed in detail in special feature sections. Annual subscription is $12.00 per year of issues.


```
;-------------------------------
;       Direct Keyboard I/O
;-------------------------------
;Inputs:none
;
;Outputs:A = carriage return, or capital ascii key pressed
;
direct_io       ld c,1          ;console input function
                call bdos
                res 5,a         ;ensure is capital w/o destoying CR
                ret
;
;-----------------------------
;       Console Input
;-----------------------------
;Inputs:none
;
;Outputs:A     = numeric keyboard entry - 1 x 4, or a carriage return
;        BC    = numeric keyboard entry - 1 x 4, if valid entry
;        CARRY = set if carriage return pressed
;
get_num         ld c,1          ;console input function
                call bdos
                cp cr           ;check for default request
                jr z,cr_only    ;return if found
                call numeric?   ;test for valid digit
                jr c,erase_inpt ;and reject if not
                sub '1'         ;remove ascii bias
                jp m,erase_inpt ;reject 0 entry
                add a,a         ;multiply by 4
                add a,a
                ld c,a          ;and convert to 16 bits
                ld b,0
                ret
;
erase_inpt      ld e,bs         ;back-up the cursor one space
                ld c,2          ;print a character function
                call bdos
                jr get_num      ;go get a good digit
;
cr_only         scf             ;indicate CR pressed
                ret
;-----------------------------
;       Numeric Input?
;-----------------------------
;Inputs:A = ascii character code from keyboard input
;
;Outputs: CARRY = reset, if is valid numeric input
;            A  = number
;
numeric?        cp '0'          ;is it < 0 ?
                ret c           ;exit if so
                cp 3AH          ;is it <= 9 ?
                ccf             ;ensure carry reset
                ret
;
;---------------------------
;       Decimal Input
;---------------------------
;Inputs:none
;
;Outputs:A     = numeric number in the range 0-255 (DE mod 256)
;        DE    = numeric number in the range 0-999
;        CARRY = set if CR is used for defaults
;
dec_inpt        ld hl,inpt_bufr ;set-up input buffer
                ld (hl),3       ;for 3 digits maximum
                inc hl          ;advance pointer
                ld (hl),0       ;and clear digit counter
                inc hl          ;advance pointer
                ld b,06h        ;set counter
clr_bf_lp       ld (hl),cr      ;and prefill buffer with CR's
                inc hl
                djnz clr_bf_lp
;
                ld de,inpt_bufr ;point to buffer, which is now ready for
                ld c,0Ah        ;read console buffer until CR function
                call bdos       ;go get input
                ld a,(bufr_cnt) ;get # of digits received
                and a           ;did we get any digits?
                jr z,cr_only    ;if not, assume default values
;
                ld hl,real_bufr ;else, get pointer to buffer contents
                ld de,0000h     ;ensure 0 result
                ld b,00h        ;pre-load B, for later use
dec_2_bin       push hl         ;save digit pointer
                ld a,(hl)       ;retrieve digit
                call numeric?   ;is it a number?
                jr c,error_dec  ;exit if not
;
                sub '0'         ;remove ascii bias
                ld c,a          ;store it temporarily
                ex de,hl        ;get old number
                add hl,hl       ;multiply x 2
                ld d,h          ;and save it
                ld e,l
                add hl,hl       ;multiply x 4
                add hl,hl       ;multiply x 8
                add hl,de       ;multiply x 10
                add hl,bc       ;add in current digit
                ex de,hl        ;put number back in DE

                ld hl,bufr_cnt  ;and adjust the input buffer counter
                dec (hl)
                pop hl          ;retrieve digit pointer
                jr z,end_dec    ;exit if done
                inc hl          ;else, adjust pointer
                jr dec_2_bin    ;and convert next digit
;
end_dec         ld a,e          ;put number in A as we expect 0-255
                ret
```

```
error_dec       call prt_errmsg ;print the error message
                jr dec_inpt     ;go get good input
;
prt_errmsg      ld de,error_msg ;retrieve string pointer
                ld c,9          ;print string$ function
                call bdos       ;go do it
                ret
;
;:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
;                       D A T A   S T O R A G E
;:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
heading         defb ff
                defb 'Printer Set-up for Epson FX-286$'
;
style_menu      defb cr,lf,lf
                defb cr,lf,lf,'<1> NLQ'
                defb cr,lf,lf,'<2> Pica'
                defb cr,lf,lf,'<3> Elite'
                defb cr,lf,lf,'<4> Italic'
                defb cr,lf,lf,'<5> Elarged'
                defb cr,lf,lf,'<6> Condensed'
                defb cr,lf,lf,'<7> Sub-script'
                defb cr,lf,lf,'<8> Super-script'
                defb cr,lf,lf
                defb 'Please select desired print style:$'
;
type_menu       defb cr,lf,lf
                defb cr,lf,lf,'<1> Emphasized'
                defb cr,lf,lf,'<2> Double-strike'
                defb cr,lf,lf,'<3> Under-lined'
                defb cr,lf,lf,lf
                defb 'Please select desired print type:$'
;
l_marg_inq      defb cr,lf,lf,lf,'Press ENTER for defaults in ()'
                defb cr,lf,lf,lf,'Select left margin (0):$'
;
r_marg_inq      defb cr,lf,lf,'Select right margin (80):$'
;
pg_len_inq      defb cr,lf,lf,'Select # of lines/page (66):$'
;
skip_perf?      defb cr,lf,lf
                defb 'Do you wish to skip-over-perforations? (Y):$'
;
skp_nlines      defb cr,lf,lf
                defb '      How many lines are to be skipped? (6):$'
;
another?        defb cr,lf,lf,'Make another selection? <Y/N>$'
;
done_yet?       defb cr,lf,lf,'Is Set-up complete yet? <Y/N>$'

all_done        defb ff,lf,lf,lf,lf,lf,lf,lf,lf,lf
                defb '                                  All Done!'
                defb lf,lf,lf,lf,lf,lf,lf,lf,lf,lf,bell,'$'
;
error_msg       defb cr,lf,lf,'Invalid input, please try again:$'
;
;these are the printer command tables, all entries are assumed to be
;three bytes long, with a terminating byte, 0FFh.

style_tbl       defb esc, 'x',  1h,0FFh ;NLQ
                defb esc, 'P',0FFh,0FFh ;Pica
                defb esc, 'M',0FFh,0FFh ;Elite
                defb esc, '4',0FFh,0FFh ;Italic
                defb esc, 'W',  1h,0FFh ;Elarged
                defb 0Fh,0FFh,0FFh,0FFh ;Condensed
                defb esc, 'S',  1h,0FFh ;Sub-script
                defb esc, 'S',  0h,0FFh ;Super-script
;
type_tbl        defb esc, 'E',0FFh,0FFh ;Emphasized
                defb esc, 'G',0FFh,0FFh ;Double-strike
                defb esc, '-',  1h,0FFh ;Under-lined
;
lmarg_tbl       defb esc,'l'            ;Left margin
left_marg       defb 00h,0FFh
;
rmarg_tbl       defb esc,'Q'            ;Right margin
rght_marg       defb 50h,0FFh
;
pglen_tbl       defb esc,'C'            ;Page length
page_len        defb 42h,0FFh
;
skip_tbl        defb esc,'N'            ;Skip-over-perforation
skp_nline       defb 06h,0FFh
;
bell_tbl        defb bell,bell          ;Sound the alarm!
                defb bell,0FFh
;
init_tbl        defb esc,'@',0FFh,0FFh  ;Clear Printer Initialization
;
extra1          defb 0,0,0,0FFh         ;a few extra's for your use
extra2          defb 0,0,0,0FFh
extra3          defb 0,0,0,0FFh
extra4          defb 0,0,0,0FFh
extra5          defb 0,0,0,0FFh
extra6          defb 0,0,0,0FFh
;
;this is the reserved area for the input buffer
;
inpt_bufr       defb 03h
bufr_cnt        defb 00h
real_bufr       defb cr,cr,cr,cr,cr,cr  ;a few extra for safety
;
;this is the reserved area for the output buffer
;
buf_ptr         defw prt_buffer         ;intialize to first byte
prt_buffer      defb 0FFh,0FFh,0FFh,0FFh ;intialize buffer contents
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh
                defb 0FFh,0FFh,0FFh,0FFh

                end
```

T/S 1000/ZX81
OP-AMP DESIGN

Mike McGlinchy

This program is a CAD (Computer-Aided Design) program to assist the user in designing 741 type internally compensated operational amplifiers. It will run on a ZX81/TS1000 or TS1500.

After keying in and running the program, you must specify the following six parameters:

1. Type: inverting, non-inverting or differential
2. Frequency
3. Voltage Gain
4. Input Voltage(s)
5. Supply voltages (VCC=VEE)
6. RI=input resistor

The computer will then calculate and list the following:

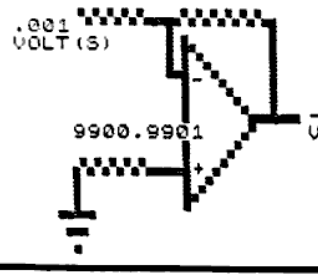
Vout
Bandwidth
Output Impedance
Feedback Resistance
RS
Phase Angle
Input Impedance

After the listing is complete, you can view the schematic diagram. This program is capable of handling the three basic op-amp configurations (i.e, inverting, non-inverting, and differential mode). Since this program is based on the popular 741 type op-amp, the following nominal values are given:

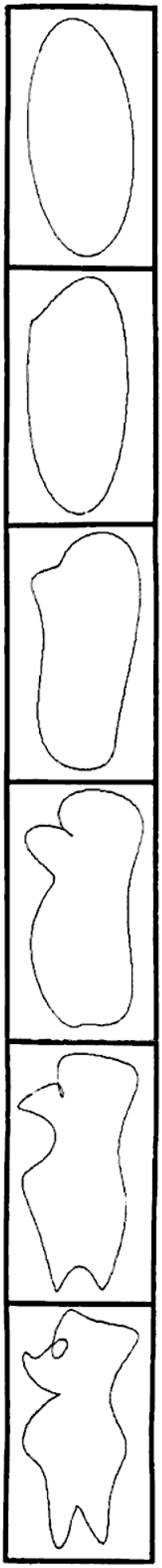
Gain Bandwidth Product=GBP=1,000,000
RI=Input Resistance=1,000,000Ω
Ro=Output Resistance=75Ω

Also, the -3dB Bandwidth is not really -3dB, but is the ideal 0dB. Above the bandwidth the rate of closure is -20dB per decade. If the op-amp's output voltage is calculated to be greater than the supply voltages, then VOUT will=VCC=VEE and a 'clip' will appear on the list.

```
TYPE.......:INVERTING
FREQ.......:100000        HERTZ
AV.........:100
VIN........:.001          VOLTS

VCC=VEE....:15            VOLTS
R1.........:10000         OHMS
VOUT.......:-.01          VOLTS
BW(-3DB)..:10000          HERTZ
ZOUT.......:68.181818     OHMS
RF.........:1000000       OHMS
RS.........:9900.9901     OHMS
PH ANGLE...:-264.28941    DEGREES
ZIN........:100909.09     OHMS

ENTER 0 TO SEE SCHEMATIC
ENTER 0 IF YOU WANT TO SEE THE L
IST AGAIN

     10000    1000000
```




```
    5 REM "OP-AMP DESIGN"
   10 PRINT AT 0,0;"ENTER TYPE 1=
INVERTING,2=NON-INVERTING,3=DIFF
ERNTIAL."
   15 INPUT T
   20 CLS
   25 GOSUB 2000
   30 PRINT AT 1,0;"ENTER FREQ"
   35 INPUT FREQ
   40 LET GBP=1000000
   45 LET R1=1000000
   50 LET RO=75
   55 LET AOL=GBP/FREQ
   60 GOSUB 2020
   65 PRINT "ENTER AV"
   70 INPUT AV
   75 GOSUB 2090
   80 IF T=3 THEN PRINT "ENTER V1
"
   85 IF T=3 THEN INPUT V1
   90 IF T=3 THEN GOSUB 2100
   95 IF T=3 THEN PRINT "ENTER V2
"
  100 IF T=3 THEN INPUT V2
  105 IF T=3 THEN GOSUB 2110
  110 IF T=3 THEN GOTO 130
  115 PRINT "ENTER VIN"
  120 INPUT VIN
  125 GOSUB 2120
  130 PRINT AT 5,0;"ENTER VCC=VEE
"
  135 INPUT VCC
  140 GOSUB 2160
  145 PRINT AT 6,0;"ENTER R1"
  150 INPUT R1
  155 GOSUB 2130
  160 GOTO 3000
 2000 IF T=1 THEN PRINT AT 0,0;"T
YPE.......INVERTING"
 2005 IF T=2 THEN PRINT AT 0,0;"T
YPE.......NON-INVERTING"
 2010 IF T=3 THEN PRINT AT 0,0;"T
YPE.......DIFFERENTIAL"
 2015 RETURN
 2020 PRINT AT 1,0;"FREQ....... "
;FREQ;TAB 23;"HERTZ"
 2025 RETURN
 2030 PRINT AT 7,0;"VOUT....... "
;VOUT;TAB 23;"VOLTS"
 2032 IF ABS VOUT=VCC THEN PRINT
AT 7,16;"CLIP"
 2035 RETURN
 2040 PRINT AT 13,0;"ZIN.......
";ZIN;TAB 23;"OHMS"
 2045 PRINT AT 21,0;"ENTER 0 TO S
EE SCHEMATIC"
 2050 INPUT S
 2055 IF S=0 THEN GOTO 3995
 2060 STOP
 2065 PRINT AT 9,0;"ZOUT........"
;ZOUT;TAB 23;"OHMS"
 2070 RETURN
 2075 PRINT AT 12,0;"PH ANGLE....
";PH ANGLE;TAB 23;"DEGREES"
 2077 RETURN
 2080 PRINT AT 8,0;"BW(-3DB). ";B
W;TAB 23;"HERTZ"
 2085 RETURN
 2090 PRINT AT 2,0;"AV......... "
;AV
 2095 RETURN
 2100 PRINT AT 3,0;"V1......... "
;V1;TAB 23;"VOLTS"
 2105 RETURN
 2110 PRINT AT 4,0;"V2......... "
;V2;TAB 23;"VOLTS"
 2115 RETURN
 2120 PRINT AT 3,0;"VIN........ "
;VIN;TAB 23;"VOLTS"
 2125 RETURN
 2130 PRINT AT 6,0;"R1......... "
;R1;TAB 23;"OHMS"
 2135 RETURN
 2140 PRINT AT 10,0;"RF........
";RF;TAB 23;"OHMS"
 2145 RETURN
 2150 PRINT AT 11,0;"RS........
";RS;TAB 23;"OHMS"
 2155 RETURN
 2160 PRINT AT 5,0;"VCC=VEE....."
;VCC;TAB 23;"VOLTS"
 2165 RETURN
 3000 LET AOL=GBP/FREQ
 3005 GOSUB 2000
 3015 IF T=3 AND AV<=AOL THEN LET
 VOUT=(V2-V1)*AV
 3020 IF T=3 AND AV>AOL THEN LET
VOUT=(V2-V1)*-AOL
 3025 IF T=1 AND AV<=AOL THEN LET
 VOUT=VIN*-AV
 3030 IF T=1 AND AV>AOL THEN LET
VOUT=VIN*-AOL
 3035 IF T=2 AND AV<=AOL THEN LET
 VOUT=VIN*AV
 3040 IF T=2 AND AV>AOL THEN LET
VOUT=VIN*AOL
 3048 IF T=1 OR T=2 THEN GOTO 305
5
 3050 IF T=3 AND V2>V1 AND ABS VO
UT>VCC THEN LET VOUT=VCC
 3052 IF T=3 AND V2<V1 AND ABS VO
UT>VCC THEN LET VOUT=-VCC
 3055 LET BW=ABS (GBP/AV)
 3056 IF T=3 THEN GOTO 3065
 3057 IF T=2 AND (VIN*AOL)>VCC TH
EN LET VOUT=VCC
 3058 IF T=2 AND (VIN*AV)>VCC THE
N LET VOUT=VCC
 3060 IF T=1 AND (VIN*AV)>VCC THE
N LET VOUT=-VCC
 3061 IF T=1 AND (VIN*AOL)>VCC TH
EN LET VOUT=-VCC
 3065 IF T=1 OR T=3 THEN LET PH A
NGLE=-180-((ATN (FREQ/BW)*57.295
77951))
 3070 IF T=2 THEN LET PH ANGLE=-A
TN (FREQ/BW)*57.29577951
 3071 IF T=1 OR T=2 THEN GOTO 307
5
 3072 IF T=3 AND V1=0 THEN LET PH
 ANGLE=-ATN (FREQ/BW)*57.2957951
 3075 LET B=1/AV
 3080 IF T=2 THEN LET RF=(AV-1)*R
1
 3085 IF T=1 OR T=3 THEN LET RF=A
V*R1
 3090 IF T=1 THEN LET ZIN=R1+(RF)
/(1+AOL)
 3095 IF T=2 THEN LET ZIN=ABS (1+
B*AOL)*R1
 3100 IF T=3 THEN LET ZIN=2*R1+(R
F/(1+AOL))
 3101 IF T=1 OR T=2 THEN GOTO 310
5
 3102 IF T=3 AND V2=0 THEN LET ZI
N=R1+(RF)/(1+AOL)
 3104 IF T=3 AND V1=0 THEN LET ZI
N=((R1+RF)+((1+B*AOL)*R1))/((R1+
RF)+(1+B*AOL)*R1)
 3105 LET ZOUT=RO/(1+B*AOL)
 3110 IF T=1 OR T=2 THEN LET RS=(
RF*R1)/(RF+R1)
 3115 IF T=3 THEN LET RS=R1
 3120 GOSUB 2090
 3125 IF T=3 THEN GOSUB 3135
 3130 IF T=1 OR T=2 THEN GOSUB 21
20
 3135 GOSUB 2160
 3140 GOSUB 2030
 3145 GOSUB 2030
 3150 GOSUB 2065
 3155 GOSUB 2140
 3160 IF T=3 THEN GOTO 3170
 3165 GOSUB 2150
 3170 GOSUB 2075
 3175 GOSUB 2040
 3180 CLS
 3990 REM :GRAPHICS
 3995 CLS
 4000 FOR B=11 TO 29
 4005 LET A=23
 4010 GOSUB 9500
 4015 FOR C=23 TO 23
 4020 FOR D=10 TO 20
 4025 PLOT C,D
 4030 NEXT C
 4035 NEXT D
 4040 FOR A=23 TO 23
 4045 FOR B=29 TO 20 STEP -1
 4050 PLOT A,B
 4055 NEXT A
 4060 NEXT B
 4065 PLOT 34,20
 4070 PLOT 35,20
 4075 PLOT 36,20
 4080 PLOT 37,20
 4085 PLOT 38,20
 4090 FOR B=11 TO 29
 4095 PRINT AT 11,20;VOUT
 4097 PRINT AT 12,20;"VOLT(S)"
 4098 IF ABS VOUT=VCC THEN PRINT
AT 13,20;"CLIPPED"
 4100 PLOT 23,14
 4105 PRINT "+"
 4110 PLOT 23,25
 4115 PRINT "-"
 4120 FOR A=21 TO 23
 4125 LET B=25
 4130 GOSUB 9000
 4135 FOR A=19 TO 23
 4140 LET B=14
 4145 GOSUB 9000
 4150 FOR A=10 TO 18 STEP 2
 4155 LET B=14
 4160 GOSUB 9000
 4165 FOR A=9 TO 17 STEP 2
 4170 LET B=15
 4175 GOSUB 9000
 4180 FOR A=10 TO 18 STEP 2
 4185 LET B=31
 4190 GOSUB 9000
 4195 FOR A=9 TO 17 STEP 2
 4200 LET B=32
 4205 GOSUB 9000
 4210 PLOT 19,31
 4215 PLOT 20,31
 4220 PLOT 21,31
 4225 PLOT 22,31
 4230 FOR B=26 TO 30
 4235 LET A=21
 4240 GOSUB 9500
 4245 FOR A=22 TO 34 STEP 2
 4250 LET B=31
 4255 GOSUB 9000
 4260 FOR A=23 TO 33 STEP 2
 4265 LET B=32
 4270 GOSUB 9000
 4275 FOR B=20 TO 31
 4280 LET A=35
 4285 GOSUB 9500
 4290 IF T=3 THEN PRINT AT 7,0;"
 4295 FOR B=20 TO 31
 4300 IF T=3 THEN PRINT AT 8,0;"
OLT(S)"
 4305 IF T=3 THEN PRINT AT 15,0;"
2
 4307 IF T=3 THEN PRINT AT 7,0;"
 4308 IF T=3 THEN PRINT AT 8,0;"
OLT(S)"
 4310 IF T=3 THEN PRINT AT 16,0;"
VOLT(S)"
 4315 PRINT AT 3,12;RF
 4320 PRINT AT 3,4;R1
 4325 PRINT AT 12,4;RS
 4330 IF T=1 THEN PRINT AT 8,0;"
N
 4335 IF T=1 THEN PRINT AT 7,0;"
OLT(S)"
 4340 IF T=2 THEN PRINT AT 15,0;"
IN
 4345 IF T=2 THEN PRINT AT 16,0
VOLT(S)"
 4350 IF T=2 THEN GOTO 4425
 4355 IF T=3 THEN GOTO 4485
 4360 REM INVERTING GROUND(+SIDE
 4365 FOR B=10 TO 14
 4370 LET A=8
 4375 GOSUB 9500
 4380 FOR A=6 TO 10
 4385 LET B=9
 4390 GOSUB 9000
 4395 FOR A=7 TO 9
 4400 LET B=7
 4405 GOSUB 9000
 4410 PLOT 8,5
 4415 GOTO 4585
 4420 REM NON INV. GND.(-SIDE
 4425 FOR B=27 TO 31
 4430 LET A=8
 4435 GOSUB 9500
 4440 FOR A=6 TO 10
 4445 LET B=26
 4450 GOSUB 9000
 4455 FOR A=7 TO 9
 4460 LET B=24
 4465 GOSUB 9000
 4470 PLOT 8,22
 4475 GOTO 4585
 4480 REM DIFFERENTIAL
 4485 FOR B=8 TO 13
 4490 LET A=21
 4495 GOSUB 9500
 4500 FOR A=22 TO 34 STEP 2
 4505 LET B=8
 4510 GOSUB 9000
 4515 FOR A=23 TO 33 STEP 2
 4520 LET B=7
 4525 GOSUB 9000
 4530 FOR A=33 TO 37
 4535 LET B=4
 4540 GOSUB 9000
 4545 FOR A=34 TO 36
 4550 LET B=2
 4555 GOSUB 9000
 4560 PLOT 35,0
 4565 FOR B=4 TO 8
 4570 LET A=35
 4575 GOSUB 9500
 4580 PRINT AT 16,13;RF
 4585 PRINT AT 0,0;"ENTER 0 IF 0
U WANT TO SEE THE LIST AGAIN"
 4590 INPUT L
 4595 IF L=0 THEN GOTO 4605
 4600 STOP
 4605 CLS
 4610 GOSUB 2000
 4615 GOSUB 2020
 4620 GOSUB 2090
 4625 IF T=3 THEN GOSUB 2100
 4630 IF T=3 THEN GOSUB 2110
 4635 IF T=1 OR T=2 THEN GOSUB 2
20
 4640 GOSUB 2160
 4645 GOSUB 2130
 4650 GOSUB 2030
 4660 GOSUB 2080
 4665 GOSUB 2065
 4670 GOSUB 2140
 4675 IF T=3 THEN GOTO 4685
 4680 GOSUB 2150
 4685 GOSUB 2075
 4690 GOSUB 2040
 4695 CLS
 9000 PLOT A,B
 9005 NEXT A
 9010 RETURN
 9500 PLOT A,B
 9505 NEXT B
 9510 RETURN
```



Hatch Your Own . . .

MICKEY-MOUSE GRAPHICS

by Fred Nachbaur, D.I.M.W.I.T. *

I'll start this article with a little T/S soap-boxing. Perhaps I should add the disclaimer that these are my views, not necessarily those of this magazine (or anyone else, for that matter).

Recent times have seen a lot of attention to video digitizing; converting an image from a video signal or from hardcopy, into an image in computer RAM, which can then be displayed on the CRT screen. This results in realistic images ONLY if you happen to have a color Mac or an Amiga, with their ultra-high resolution, huge color palette, and correspondingly humungous RAM.

However, when using the Timexes and Sinclairs (even the 2068 and QL), this has always struck me as a case of the tail wagging the dog. Even the best images that result are grainy, with unrealistic colors. In short, "Mickey-Mouse."

The situation gets even worse when converting such images back to hardcopy. When using a printer, even the finest software gives only rather primitive grey-scales. Color plotters might seem to be an improvement at first glance, but with their palette of (typically) four colors, the pictures that result are usually little more than interesting curiosities.

What has always fascinated me about the computer is its capability to GENERATE graphic images. What does a computer do best? Compute! I.e., crunch numbers, slavishly running complex mathematical formulas and displaying the results in graphical form. From this viewpoint, the only difference between the ZX81 and the Cray II is speed of execution. (Well, ok. There may be one or two other, albeit minor, differences.) To paraphrase an ancient philosopher, "Give unto VCR's that which is video, and to computers that which computes."

It is entirely thanks to the computer that a whole new geometry has emerged; the "fractal" geometry discovered and pioneered by Benoit Mandelbrot and friends, and explored by countless amateur computerists. Fractals are not the only "interface" between mathematics and art; the side-panels accompanying this article, showing how a mouse hatches from an egg, was done with Fourier analysis, a mathematical procedure two centuries old. Want more? How about wire-frame graphics of geometric shapes, "wallpaper" algorithms, "Navajo rugs," spirograms, and on and on.

Very well, now that your computer has taken some nifty algorithm and transformed it into a breath-taking display, how do you save it for posterity? Sure, you can save screens and recall them later, but what if you want faithful hardcopy? As mentioned earlier, ordinary printers work fine with monochrome images and line-drawings. Inexpensive color printers or plotters do a little better, since they can print in red, green and blue in addition to black. Such images still fall far short of the color capability of the QL, TS2068, or TS1000 with Oliger TI video. Darn. Guess we'll just have to go out and buy a $2000 color laser printer. WRONG!!!

Super-CHEAP Super-GRAPHICS

Timexers have become renowned for finding simple solutions to hairy problems. Is there an inexpensive way of getting faithful hardcopy of even the most complex color screens? Going further, is there any way of getting color hardcopy from a completely stock TS1000 with its black-and-white TV? The answer to both questions is YES. Would you believe that the first is possible with hardware you probably already own, no additional software, at a cost for supplies under 50 cents per copy? Or that breath-taking color from a ZX81 takes just a little more software savvy, patience, and experience?

The solution lies in something that might seem pretty "Mickey-Mouse" at first, but is really very elegant and simple. We're going to take a look at an "ancient" technology, going way back to a certain Mssr. Daguerre. That's right; ordinary, everyday photography. Many people are under the delusion that taking a picture of a CRT screen is impossible, or at best, very difficult. In actual fact, it's barely more involved than taking a snapshot of your fishing buddy proudly displaying his prize minnow.

* Dabbler In Many Weird, Interesting Technologies

THE POLAROID APPROACH

I have seen acceptable snapshots done with some of the newer Polaroid or Kodak "instant cameras." These have the advantage of providing hardcopy within seconds of taking the snap. However, there are a few problems associated with these that make them less than ideal, assuming that you don't need the "instant" feature.

One problem has to do with parallax. At the close range that is required, these and other "viewfinder" cameras will displace the image because of the distance between the viewfinder and the "taking" lens. Another problem is that the user seldom has full control over exposure time and lens aperture. Further insight into this may come when you read the following section. Lastly, your acquired picture is the only one of its kind. There is no cheap way of making dupes and enlargements, or correcting minor exposure or framing errors.

THE VERSATILE SLR

I've found the SLR (single-lens reflex) 35 mm. camera to be the best tool for taking photos of computer-generated images. Even a cheap, used, off-brand model will be fine for the task at hand. Since focusing and framing is done via the same lens as is used for taking the actual picture, there is never a parallax problem. Furthermore, you generally have full contol over exposure time (shutter speed) and aperture, the two main variables determining your final picture.

A tripod is very helpful, almost essential. You CAN do without it, by bracing your camera atop a stack of books or other props, but a decent tripod makes it SO much easier and less frustrating.

SHUTTER SPEED

The reason that a tripod is needed, is because acceptable pictures are only produced at slow shutter speeds. Consider that a TV or monitor screen is basically a serial device, scanning a complete picture in 1/60th of a second. If shutter speed is less than 1/60, then only a portion of the screen will actually expose the film. Also, actual shutter speed at 1/60th will rarely be EXACTLY the same as the vertical interval of your computer, nor will it be in "sync". The result can be narrow bands of darkness (not exposed), or brightness (partially double-exposed). Since most SLR's have a "focal-plane" shutter, they will also tend to introduce diagonal bars or "tears" in your picture if the timing isn't perfect. Shooting at 1/30th reduces both effects, and shooting at 1/15 virtually eliminates them. However, to be completely safe, you might consider shooting at 1/4 sec. This corresponds to an exposure of 15 frames; one partial exposure out of 15 full ones will never be noticed.

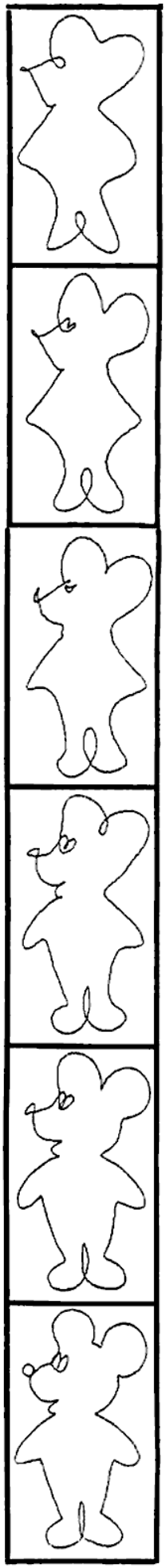
APERTURE

The other control that varies the amount of light that reaches the film is the lens aperture setting. There are basically two ways of setting this; by using a light-meter, and by trial and error. If you use a light meter, fill your screen with a representative image, to get a reasonable starting point.

WARNING TO ADVANCED SHUTTER-BUGS: Even though your CRT is actually emitting light, DON'T use an incident light meter. Use your good old reflected light meter. The reason is that the CRT behaves photographically AS THOUGH it were reflecting light from an external source.

If you use the trial-and-error approach, shoot a test roll at various apertures, at both 1/8 and 1/15 second shutter speeds. Fill the screen with a representative image, containing approximately equal areas of all colors. When the roll comes back, look at the NEGATIVES to find the one(s) that have the best exposure. HINT: use a B&W film of the same speed as your proposed color film, and "develop only" to keep costs down.

Whether you use your light meter, or the trial-and-error approach, don't go whole-hog on your first session. Have your first run of pictures developed first. You can thereby inspect the negatives to make any necessary corrections. One reason is that some films exhibit "reciprocity effect" at long exposure times, making light meter readings less accurate. Another is that the garden-variety "averaging" meter may not give a true reading with the photographically "unusual" subject matter.



Adjust your contrast and brightness as well as the color controls to give the clearest picture possible. A lower "brightness" than usual will generally give superior photos. At the other end, extremely dim screens will typically have a bright "edge" or "flare" at the juncture of different colors. If you have a video peaking control, adjust it to give a sharp image without flares. Mark the optimum settings with a Jiffy-marker, to make your setup easy to duplicate next time. Unless you're experimenting with special effects (as below), be wary of changing your monitor settings during a photo session.

I found that when using my 13" Sakata color monitor with the QL, and shooting on 200 ASA Fuji film, my optimum setting was f11 at 1/15 sec., and f16 at 1/8 second. The pictures shot at 1/15 were indistinguishable from 1/8 second, using an older-model Canon SLR.

If you have several monitors, use your best one for your photo sessions. Look at color saturation, sharpness, and geometry (are rectangles truly rectangular? Are circles circular?).

LIGHTS OUT!

This is important. If you ignore this, you'll be sorry when you get your prints back. When taking your picture, the room should be completely darkened. The ONLY light source should be your monitor. The reason is that any light in the room will cause reflections from the front glass of the monitor. "Anti-reflective" coatings or glass will NOT eliminate this effect! You may not even notice it while taking the picture; the eye (brain) is remarkably adept at tuning out such "noise." The camera, however, is adamantly unforgiving.

Other advantages to "lights out" are that blacks will truly be black, and that the frame of the monitor will usually not show. If it does, consider painting it black (or covering with black camera tape) before further experiments.

This next admonition may sound silly to advanced shutter-bugs, but you'd be surprised at how many people will make this error; using an electronic flash. Pictures taken with a flash will only be pictures of a blank white screen. Remember, the video display is a light SOURCE. It does NOT operate by reflecting incident light. Using a flash will completely wash it out.

FRAMING

As mentioned earlier, using an SLR will allow you to exactly frame your picture. Take the time to frame your screen properly. Not only should the TV screen be centered in your viewfinder, but it should also be free of distortion because of an improper viewing angle. Pay close attention to the top and bottom; if the top is wider than the bottom you'll have to physically lower the camera, and vice versa. Same goes for left-right alignment. Stand back from your setup as another check; the plane of the TV screen should be exactly perpendicular to the camera lens' line of sight. (Now do you see why I recommend using a tripod?)

Finally, don't fill the entire viewfinder frame. Most cameras (the inexpensive ones, anyway) don't have an exact correlation between the borders of the viewscreen, and the actual edge of the film image. Furthermore, in process of printing, a little bit of the image is always lost around the edges. Keep the TV screen image in an area about 90% of the full viewscreen, and you should be alright.

Advanced Topics

If you're a more advanced photographic enthusiast (perhaps even a professional), there is really no limit to the magic you can do with your computer and camera. I'll touch on some ideas for you to experiment with.

MULTIPLE EXPOSURES

If your camera allows double or multiple exposures, and if you have at least some software expertise, you can have yourself a field day.

How about unlimited colors? One way to do this is by using your TINT control to give colors not "normal" for your machine; e.g. browns, fleshtones, violet, etc. The reason I mention software expertise is that you'll have to figure out some way of "filtering" all but the desired color(s), leaving the rest black. Make an exposure of these, then reprint the screen with your "alternate" colors, adjusting TINT to give the desired effect. Make the second exposure. Continue as far as practical, or you have patience for.

At the beginning of this article I promised a way of displaying full-color images from a stock ZX81, using an ordinary white-screen TV set. Again, multiple exposures can be used to display as many colors as you like. This time, however, you'll need a set of optical filters of the desired colors, as well as the ability to do "software filters" to display only the material of each color, for each exposure. Ordinary colored cellophane actually works surprisingly well. If you're in a larger city that has a motion-picture supply house, try to get a booklet (usually free) of "sample" lighting filters, as supplied by Lee and other companies.

When using optical filters, you'll also have to know the "filter factor" for each color filter used. If not given, you can get an approximation by using your light meter; point the camera at a blank white wall, and note the f-stop reading. Put the filter in front of the lens, and determine by how many stops the light has been decreased by the filter. This will typically be between 1/2 and 2 f-stops. Use this data to compensate your aperture opening during exposure.

Let's say you want to do a color picture of a particularly neat fractal. Plot only those points corresponding to each color, then shoot it with the appropriate filter. Continue to your heart's content. In principle, especially if you are doing the picture in WRX16 hi-res, you can come up with pictures that look as if they were done on a Mac.

When doing multiple exposures, a GOOD tripod is absolutely essential. So is a bulb or cable release. The SLIGHTEST movement will throw your picture out of registration, and thus betray your "secret."

Another factor that affects registration is electronic in nature. Especially at high brightness, the distribution of light and dark on a CRT can affect the width (and sometimes even the height) of the displayed image. This is called "blooming." Reduce blooming to a minimum by using the lowest brightness that will give an acceptable picture.

Many cameras, especially the more modern ones, are extensively interlocked against accidental multiple exposures. Fine for the ordinary snap-shooter, but a real bane for advanced amateurs and beyond. Some cameras can be "tricked" into multiple exposures by holding the rewind release button while advancing the film. I say "some," because while many will allow this, they may not

keep perfect registration. The only way to find out if your camera holds the film securely enough during this operation, is to experiment.

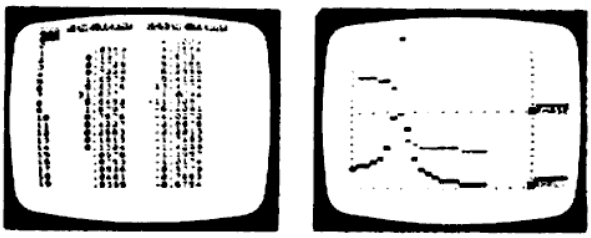
This next suggestion might curl the toe-nails of pro's and semi-pro's, but don't write it off as "just one of ol' Fred's ravings." Remember the Argus C-3? These were made by the millions in the '50's, and are still giving camera reviewers flashback nightmares. However, it is IDEAL for playing around with computer photography. Why? Let me count the ways. It can be picked up CHEAP at any photographic junk shop. It uses readily available 35mm film. It has a between-the-lens leaf shutter, causing much less trouble with video images than do focal-plane shutters. It are almost too easy to double-expose. Its blocky shape is a boon if you don't have a tripod, and rely on a stack of bricks to keep your act together. Focusing is easy with its split-image rangefinder. The only thing you'll really have to worry about, is parallax. However, this won't take you long to compensate, with a little experimentation.

SELECTIVE DEFOCUSING

Getting back to our friend, the SLR, there is another trick you can use to actually IMPROVE the image you see on the TV, especially with color monitors. Since these have discrete dots making up the plane of the display, the photos that result can have an obviously grainy "video" look.

Most SLR's automatically open the aperture all the way during set-up and focusing, both to allow for maximum brightness and to narrow the depth-of-field to make focusing easier. However, all but the cheapest ones have a way to override this, so you can view your scene at the actual aperture selected. You can use this feature to slightly de-focus your image, causing the discrete phosphor dots on the CRT to blend together.

You'll have to use judgement, and the wisdom of experience, to determine how much defocusing is ideal. Not enough, and you still have the grain. Too much, and you lose resolution, making the picture look obviously out of focus. Done right, however, it will be difficult to tell that the resulting photos were shot from a TV or monitor screen.



A PARTING SHOT....

I'll leave you with a little anecdote. Shortly after the ZX81 came out, I worked up my first "big" program. The TS2040 was not yet available, and I refused to buy that awful "ZX" printer. Guess how I generated program listings, and screen dumps for my documentation? That's right, I used my trusty rusty SLR to shoot each screen, then had the film contact-printed. Early purchasers of my original FOURIER package (the predecessor to the program that did the side-panels shown here) may still be wondering to this day, how I got those clean, sharp "mini screen-dumps" back in those bad old days. Well now you know.

The circle is complete. From a stop-gap measure because suitable printers didn't exist, to high-res color fractals, good old conventional photography STILL has little competition if you want striking color hardcopy of your graphic computer displays. Especially if you consider the cost!

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All the games listed in this ad will run on the ZX81, TS1000 or TS1500 with 8K static RAM and 16K user RAM. ("VOYAGE OF THE SEAWITCH" requires 32K or more.)

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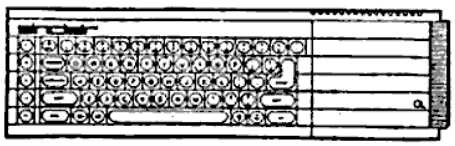

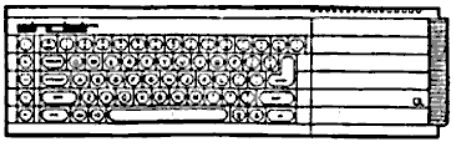

Tucked away in a description of the QL hardware in the Technical Guide is mention of the fact that bit 7 of the Display Control Register "can be used to switch the base of screen memory from $20000 to $28000". Hmmm, interesting I thought and went on to more pressing concerns.

Recently, I went back to investigate the dual screen display. There is a discussion & program dealing with it in Adrian Dickens "QL Advanced User Guide". The news is it is real; but flawed. First a quick overview of the QL memory map.

K	HEX	USE
256K	00040000	Top of On Board RAM
192K	00030000	Top of Screen1
		Top of Common Heap
		Base of Common Heap
	00028480	Top of Sys_Var
160K	00028000	System Variables & Base of Screen1
	00027FFF	Top of Screen0
128K	00020000	Base of Screen0

The immediate problem with the second Screen is the fact that the System Variables are locked into $28000 which is the base of Screen1. This means that if you simply flick the bit which controls the base of the display, you will get a bunch of garbage on the top of your screen. The garbage is the video representation of the System Variables.

You can take a look at this effect with the following short Superbasic Procedure.

```
100 REMark switch in Screen 2
110 :
120 DEFine PROCedure SWITCH
130     SV_MCSTA=163892 : REMark $28034
135     DC_REG  =98403  : REMark $18063
140     DCR_STATUS=PEEK(SV_MCSTA)
150     DCR_STATUS=DCR_STATUS ^^ 128: REMark toggle bit 7
160     POKE SV_MCSTA,DCR_STATUS     : REMark tell Sys_Var
170     POKE DC_REG,DCR_STATUS       : REMark tell hardware
180 END DEFine SWITCH
190 :
```

This is interesting, but useless. To make a useable display, one has to be a little trickier. One of the neat things about the QL is that QDOS is extensible. In particular, one can link in tasks for the QL to perform after each interrupt. There is a Level 2 Interrupt (called a Frame Interrupt) on the QL every 1/60 second; which is related to the Vertical Sync signal.

What we need to do is Link in a short Task which checks what screen we are displaying; then if we are displaying Screen0, do nothing, while if we are displaying Screen1, wait until the display has passed the 5K or so of System Variables then switch in Screen1.

The assembly language code to do this is listed below in the file DualScr_asm. Once you have this code installed, you will run into the next problem. There is no support in QDOS for writing to Screen1. It is evident that in the development of the QL, this was a matter of some debate, because in the SCR/CON Channel Definition Block (CD_Blk), there is an entry (SD_SCRB) Base address of screen. The unfortunate fact is that the SCR/CON device driver does not use this variable. Instead the base address ($20000) is hardcoded into the driver. This was no doubt done in concert with the decision to tie the System_Variables at $28000.

As the QL is at present, if the driver did use the CD_Blk variable, clearing the screen would erase all the System_Variables; so it is just as well that it is not implemented!

What's to do? It seemed to me that the simplest method to use would be to simply copy Screen0 into the useable part of Screen1. The Superbasic extension SCOPY performs this task. I wanted a Clear Screen1 capability as well, so I added the PROCedure SCLR. This procedure expects one parameter which is used to colour Screen1. The video ram of the QL display is arranged thus:

```
Mode 4
Even Byte : Odd Byte
76543210    76543210     - Bits
GGGGGGGG  : RRRRRRRR                G - Green
                                    R - Red
Mode 8                              F - Flash
Even Byte : Odd Byte                B - Blue
76543210    76543210     - Bits
GFGFGFGF  : RBRBRBRB
```

Passing SCLR the parameter 0, will paint the screen black. You can play with other parameters to see the effect of setting various bits. If you use 65280 for Green, the interpreter returns an overflow error; but -256 works fine. 255 paints the screen red.

The procedure SCR0 turns off the Auto-Toggle and gives you the default display, ie. Screen0. The procedure SCR1 turns off the Auto-Toggle and gives you Screen1. The procedure SCRA turns on the Auto-Toggle; ie. switch between the two screen using <CTRL><F5>.

The function SCRNUM tells you which screen is currently being displayed, 0 or 1. The function SWHERE tell you the base of the Common Heap Memory reserved by the initialization code.

There are some proviso's with this code. It should be initialized from a boot: in particular before a directory of a second device is done. This is because we want Screen1 to begin as close to the Base of the Common Heap as possible. If you do a directory of another device before initialising; QDOS reserves some common heap as a Channel Definition Block and a Physical Definition Block. This will show up as a white band similar to what SWITCH produces.

Related to this situation is the value of the Timeout value used to wait before switching Screen1 on. See the comments in the _asm file.

The other proviso, is that the dividing line where Screen1 switches in is not stable. The easiest way to handle this problem, is to put a black border over the region similar to the PROCedure SDEMO below.

The first SBasic program below creates a file DSCR_ext which is used by the second the SBasic program SDEMO.

```
100 REMark PLAY WITH SCREEN UTIL
110 :
120 LAYOUT
130 INIT
140 DEMO
150 STOP
160 :
170 DEFine PROCedure DEMO
180   PAPER 0: CLS
190   PICTURE
200   PAPER 4
210   AT 0,0: PRINT 'SCREEN 1'
220   SCOPY
230   SCR1
240   CLS
250   SCR0
260   SCRA
270   LIST TO 260
280   AT 0,0: PRINT 'SCREEN 0'
290   PRINT#0,'USE <CTRL><F5> TO TOGGLE SCREENS'
300 END DEFine DEMO
310 :
320 DEFine PROCedure PICTURE
330   FOR M=0 TO PI STEP .25: FOR N=0
TO 105 STEP 15 : INK (RND(2,6)): CIRCLE 20
0,128,N,.5,M: END FOR N : END FOR M
340   INK 7
350 END DEFine PICTURE
360 :
370 DEFine PROCedure INIT
380  nam$='SCR2_ext'
390  dev$='flp1_'
400  LBYTES dev$ & nam$,RESPR(512)
410  PRINT'Loaded'
```

```
420  CALL RESPR(0)
430  PRINT'Initialized'
440 END DEFine INIT
450 :
460 DEFine PROCedure  LAYOUT
470   WINDOW#0,512,64,0,0    : BORDER #0,10,0
480   WINDOW#1,512,192,0,64 : BORDER #1,10,0
490   WINDOW#2,512,192,0,64 : BORDER #2,10,0
500   PAPER#2,4: INK#2,0
510   PAPER#1,4: INK#1,7
520   PAPER#0,2: INK#0,7
530   SCALE 256,0,0: MODE 4
540 END DEFine LAYOUT
550 :
100 REMark Create SCR2_EXT file
110 :
120 DLOAD
130 DSAVE
140 STOP
150 :
160 DEFine PROCedure DSAVE
170    REMark Save memory to file
180    nam$='SCR2_ext'
190    dev$='flp1_'
200    SBYTES dev$ & nam$,RESPR(0),408
210 END DEFine DSAVE
220 :
230 DEFine PROCedure DLOAD
240   REMark writes DATA to memory & inits PROC & FUNC
250   addr=RESPR(512)
260   RESTORE 400
270     REPeat loop
280       READ x: IF x=-1: EXIT loop
290       POKE addr,x
300       addr=addr+1
310     END REPeat loop
320   PRINT#0,'Loaded '
330   CALL RESPR(0)
340   PRINT#0,'Initialized'
350 END DEFine DLOAD
360 :
370 REMark SCR2_ext code for 2 screens utility
380 REMark SCLR,SCOPY,SCR0,SCR1,SCRA; SCRNUM,SWHERE
390 REMark
400 DATA 67,250,0,70,52,120,1,16
410 DATA 78,146,116,0,34,60,0,3
420 DATA 0,0,65,249,0,2,128,0
430 DATA 32,40,0,8,65,240,8,0
440 DATA 146,136,47,1,112,24,78,65
450 DATA 34,31,74,128,102,24,67,250
460 DATA 1,16,34,136,67,250,1,24
470 DATA 65,250,1,12,112,28,33,73
480 DATA 0,4,78,65,112,0,78,117
490 DATA 0,5,0,144,4,83,67,82
500 DATA 65,0,0,144,4,83,67,82
510 DATA 48,0,0,144,4,83,67,82
520 DATA 49,0,0,88,5,83,67,79
530 DATA 80,89,0,34,4,83,67,76
540 DATA 82,0,0,0,0,2,0,174
550 DATA 0,83,67,82,78,85,77,0
560 DATA 0,116,6,83,87,72,69,82
570 DATA 69,0,0,0,52,120,1,18
580 DATA 78,146,74,128,102,8,12,67
590 DATA 0,1,103,4,112,241,78,117
600 DATA 48,54,152,0,65,250,0,154
610 DATA 32,80,67,249,0,3,0,0
620 DATA 48,192,177,201,101,250,96,0
630 DATA 0,132,67,249,0,3,0,0
640 DATA 32,9,65,250,0,124,32,80
650 DATA 144,136,83,64,69,249,0,2
660 DATA 128,0,19,34,81,200,255,252
670 DATA 96,98,67,250,0,104,80,209
680 DATA 96,90,67,250,0,96,66,81
690 DATA 96,82,67,250,0,88,50,188
700 DATA 0,255,96,72,67,250,0,74
710 DATA 34,17,34,110,0,88,93,73
720 DATA 45,73,0,88,66,118,152,0
730 DATA 74,129,103,16,52,60,8,32
740 DATA 83,66,227,129,104,250,226,145
750 DATA 61,130,152,0,45,129,152,2
760 DATA 120,2,96,24,114,1,194,58
770 DATA 0,29,34,110,0,88,85,73
780 DATA 45,73,0,88,81,129,152,0
790 DATA 56,60,0,3,112,0,78,117
800 DATA 0,0,0,0,0,0,0,0
810 DATA 0,0,0,0,0,0,18,46
820 DATA 0,52,19,193,0,1,128,99
830 DATA 74,43,0,7,103,36,74,174
840 DATA 0,152,102,50,74,174,0,156
850 DATA 102,44,74,46,0,238,102,38
860 DATA 48,60,6,44,81,200,255,254
870 DATA 8,193,0,7,19,193,0,1
880 DATA 128,99,74,43,0,6,103,14
890 DATA 74,46,0,51,103,8,81,238
900 DATA 0,51,70,43,0,7,78,117,-1
910 :
```

MANDELBROT -- A Fractal World

Part Three

Michael E. Carver

The Machine Code

Now that we have the BASICs out of the way, we can get down to the microcode or the machine code portion of our program. It is not my intention to provide an introductory lesson in 68000 assembly language programming with this article. However, I do intend to cover QL specific instructions (i.e., Traps and Vectors). There are a number of books available to teach the basic instruction set of the 68000 family of chips. One series of books is available from Motorola for a very reasonable charge.

Before I get started with our discussion of the various supporting machine code programs, a short disclaimer. This program was my first attempt at coding in 68K code. Experienced programmers will find some awkward and round-about approaches in the code.

MANDELBROT SOURCE CODE

start

One of the important things to remember, when writing machine code for the QL, is that the Register D0 must contain the value of 0 for a successful return to BASIC. The QL uses this register to provide for error traps and reports when returning from Trap or Vector calls. Any value, other than 0 in D0, is seen by the ROM as an error when returning to BASIC, or concluding a Trap/Vector call. See pages 19-20 of the Concepts section of the QL User's Guide for a breakdown of the Error Report Codes. D0 will contain a negative value for an official error (i.e., -1 = not complete; -2 = invalid job,; etc.). The first routine in our source code, *start*, simply locates and stores the location of the array data area to be used by the machine code program.

calc

Our next section is one of the round-about methods I warned you about. Its role is to retrieve, from BASIC, certain floating point values needed for the reiterative calculations. The straight-forward approach would be to obtain these values from within the machine code program, using an input from keyboard routine. Even so, some valuable lessons can

be learned from this section of code. In the QL, the SuperBASIC memory area is dynamic. It can grow or shrink and move about within memory. For this reason, the A6 register is used to point to the base address of this area. Any particular location in this area, including SuperBASIC system variables or the BASIC program, is referenced relative to A6. Each area of this memory is indexed by two pointers, for the start and the end. These "stacks" are upside down. The SuperBASIC system variables start at offset $00. (Note: I will be using "$" to indicate numbers in HEX.) Each procedure, function, and variable created from within SuperBASIC is indexed via a name table and a name list. Their starting addresses are found in the SuperBASIC system variables area. Their offsets are $18 (BV.NTBAS) and $20 (BV.NLBAS) respectively--both long words. Their ending addresses are found at offsets $1C (BV.NTP) and $24 (BV.NLP).

The Name Table is composed of blocks of eight bytes. This block contains information on the type, a pointer to the location in Name List, and a pointer to the value. See Table 1 for a complete breakdown of this information.

Let's now look at the *calc* routine of the code. The comments accompanying the first few lines of this routine are misleading. The result of *move.l $1c9a6),a1* does not retrieve the actual address, only the offset from A6. By adding A6 to A1, the actual ending address of the table is found. Since the SuperBASIC variables we wish to pass to the machine code program are floating point, we are looking in the Name Table for the occurence of "$0202" (see Table 1). The actual names are stored in the Name List with one byte for the length of the name, followed by the ASCII of the name. Checks are made through the Name Table for floating point variables. If one is found, its entry in the Name List is calculated and a check for either *c1* or *c2* is carried out. By declaring the machine code variable *space* as a long word of 0 and by transferring the data from the Name List into the first 3 bytes of *space*, we can make a long word check against D1 and D2 (see section labeled *flpoint*). The Name List is not arranged in a normal 68000 manner. It is customary, in 68K assembly language, to insure that all addresses be on word boundaries (i.e., even addresses). When found, the addresses of the actual floating point values are stored in their appropriate machine code spots.

Floating point variables are stored in the QL with six bytes (a 16-bit exponent with a 32-bit mantissa). Integers are stored as two's-complemented words. The QL stores strings with the first word defining the length of the string, followed by the actual string itself. If the string is an odd number of bytes long, it will be stored with a spare byte to adhere to the normal 68K convention of word boundary addresses. Array storage is rather complex. There is one long word as a relative pointer to the actual start of data. This is followed by a word for the number of dimensions. For each dimension, a pair of words is used which define the dimension along with an index multiplier for it. This preamble is followed by the actual array, using the same format as stated above for integer, floating point, or string.

set_up

The first portion of this section moves the actual floating point data from the SuperBASIC variable area into our machine code variable area. We are now ready for our first voyage into the QL ROM via Vector utilities--floating point math.

Before any calculations are carried out, a check for ample space on the maths stack should be performed. This is accomplished by the Vector utility $11A (BV.CHRIX - reserve space on maths stack). Upon entry, D1 should contain the number of bytes needed (as a long word). When exited, the following registers are effected:

D1	corrupted	A0	preserved
D2	corrupted	A1	preserved
D3	corrupted	A2	preserved
		A3	preserved

If there is insufficient space on the stack, this Vector call will expand it. This may entail moving the stack's location. The location of the stack is found by checking the SuperBASIC variable BV.RIP, which has the offset from A6 of $58.

bigloop

Floating point routines, within the QL ROM, are accessed by two different Vectors, RI.EXEC - $11C for one operation and RI.EXECB - $11E for a list of operations. Upon entry, the following registers should be set up as follows:

D0.W	operation code (RI.EXEC only)
D7.L	set to 0 to insure reliable execution
A1.L	pointer to maths stack (relative to A6)
A3.L	pointer to the list of operations (RI.EXECB only)
A4.L	pointer to base of variable area (relative to A6)

The following registers are affected by the call:

D1	preserved	A0	preserved
D2	preserved	A1	updated pointer to maths stack
D3	preserved	A2	preserved
		A3	preserved
		A4	preserved

An error report -18 in D0 will indicate an arithmetic overflow.

See Table 2 for the various math functions available. All results of the math operations will be found on the top of the stack. RI.DUP (duplicate) is the only exception, in that it will increase the stack by one item and update the stack pointer leaving two items on the stack. The first four remove the first item on the stack and replace it with the result. The next four (along with RI.POWFP) take both items on the stack and replace them with one item and thus decrease the size of the stack. The remaining functions will remove the top item on the stack and replace it with the result. To use the RI.EXECB (list of operations), A3 should point to the list of bytes (opcodes). This list must end with $00.

All of the math operations carried out by this portion of the code have only two items on the stack, though room was reserved for 4 floating point numbers. This allows us to leave certain items on the stack and by changing the stack pointer, carry out another operation. Finally, this new result can be combined with other items left on the stack for further math operations. This saves the need of pulling items off the stack, storing and retrieving them when needed later. Scan the code between *bigloop* and *check* and see if you can trace this manipulation of the maths stack. (Refer to the first article in this series to see a BASIC version of the calculations being carried out by this portion of the code.)

The remainder of the Madelbrot Source Code should be fairly self explanatory.

SNAPSHOT SOURCE CODE

IMPORTANT NOTE: There is a major error in both the source code and the BASIC loader (Listing 4, TDM Nov/Dec '87) for the Snapshot machine code routine. A "typo" reversed two numbers in the source code. In the source code, lines labeled *snapshot* and *paste* should read 131086 not 131068. In the BASIC Listing (see lines 1000 and 1020) "8828,1,-4,16890" should read 8828,2,14,16890. My apologies to all who could not de-bug this careless error.

This is a straight-forward piece of code. It reads a group of bytes form a certian section of the screen's memory map and stores them in a variable area contained in the machine code program. My approach to accomplish this was rather amateurish, but quick and dirty. To find the actual starting point for the upper left-hand corner of the mini-window area, I POKE'd numbers into the screen's memory until I found the exact point. the screen's memory starts at $20000 or 131072d and is a total of 32K long. The actual screen grid is 128 bytes wide and 256 bytes high. The mini-window is 24 bytes wide and 36 bytes high. The window starts 14 bytes from the start of the screen and is 24 bytes wide. By adding 80 to the last address of the window's scan line, we will be exactly 1 line below the start of the previous location (or a total of 128 bytes). The paste routine reverses this process by moving the copy of the mini-window area back to the screen.

start

This machine code module contains two separate routines. One, *start*, plots the mandelbrot map from already compiled data. The other one, *plot*, draws the map while it is being calculated. The first section of code (*start, m_loop and n_loop*) run through the already calculated data, setting the proper ink color and plotting each point to the screen. Let's examine the various subroutines used by both routines.

convert

This subroutine is a maths operation executed by calling the RI.EXEC Vector previously discussed. Before we can plot a point to the screen, the x and y coordinates must be in floating point forms.

ink

```
The color attributes for any
window can be set by calling one of
three Trap #3 routines. They are:

     SD.SETPA --- D0=#27 --- paper color
     SD.SETST --- D0=#28 --- strip color
     SD.SETIN --- D0=#29 --- ink color
Upon entry, the following registers need to be set
accordingly:

     D1.B      color
     D3.W      timeout (-1)
     A0.L      channel ID
Upon returning, the following registers are affected:
     D1   preserved     A0   preserved
     D2   preserved     A1   corrupted
     D3   preserved     A2   preserved
Errors:  -1 not complete or -6 invalid channel ID
```

Channel ID's in machine code are not quite the same as Channel #'s in SuperBASIC. The Channel Table contains pointers to channel definition blocks within the common heap (or $FF000000 if the channel is closed). The channel ID consists of two words. The low word is a reference to its location in the Channel Table and the high word is the tag number. Every time a channel is opened, its tag number will be one greater than the previously opened channel. When the QL is fired up, 3 default channels are open. $00000000 is SuperBASIC channel #0 (the lower window), $00010001 is SuperBASIC channel #1 (the print window), $00020002 is SuperBASIC channel #2 (the list window). No matter what the SuperBASIC channel # is for the next channel opened (i.e., #32), it will almost certainly have the channel ID of $00030003. The Mandelbrot program uses the default window #2 to display the mandelbrot map, making calculations of the channel ID a snap.

This section of code uses the color data POKEd into memory by the SuperBASIC program (lines 2830 and 4250). The distance point from the mandelbrot set (1 to 255) is used as an index pointer to the appropriate color in this table.

plot

```
Graphic routines from within
machine code are also accessed
through Trap #3 functions:
     SD.POINT --- D0=#30 --- plot a point
     SD.LINE --- D0=#31 --- draw a line
     SD.ARC --- D0=#32 --- draw an arc
     SD.ELIPS --- D0=#33 --- draw a circle or elipse
     SD.SCALE --- D0=#34 --- define scale and origin
     SD.GCUR ---D0=#36 --- define text cursor position
Upon entry, the following registers must be prepared:
     D3.W   timeout (-1)
     A0.L   channel ID
     A1.L   maths stack pointer
Upon exit, the following registers are affected:
     D1   corrupted     A0   preserved
     D2   preserved     A1   corrupted
```

Each of the functions require that certain parameters (floating point form) be placed on a maths stack pointed to by A1. This stack is also upside down. To insure successful operations of the functions, there should be 240 bytes free on the stack. See Table 3 for the parameters which must be on the stack (relative to A1) for each of the graphic routines.

start2

Unlike the routine at *start*, this routine only plots one point at a time, updating the machine code variables for the x and y coordinates before returning to BASIC. It also uses the same subroutines detailed above.

Some of the variables used by this code may have been POKEd into their location from SuperBASIC (array, m_point, n_point and color). This is another round-about method of passing parameters from SuperBASIC to machine code.

I hope this article will be a start for the aspiring 68000 machine codists. There is a great potential lurking in the heart and soul of the QL, and most of it is easily accessible via machine code. I feel that 68K machine code is much more flexible and dynamic than Z80. (Now, now, if any of you Z80 fans have gotten this far, don't count me as an ex-Z80 buff. One will still find me hacking away at the ole Silver Avenger--TS2068!!) With the availability of a large number of Traps and Vectors, much of the chore of coding in assembly language has been removed. Once again, I would like to apologize to any who may have lost a few nights sleep due to the error in the Snapshot code.

Due to the length of the source code listing of Michael Carver's Mandelbrot machine code subroutine, this listing will be included next issue, when this series concludes. _ editor

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TABLE 1 -- Variable types

word	*defines the type of the name*
%0001	undefined string variable
%0002	undefined floating point number
%0003	undefined integer
%0101	string expression
%0102	floating point expression
%0103	integer expression
%0201	string variable
%0202	floating point number
%0203	integer
%0300	substring (used internally only)
%0301	string array
%0302	floating point array
%0303	integer array
%0400	SuperBASIC procedure
%0501	SuperBASIC string function
%0502	SuperBASIC floating point function
%0503	SuperBASIC integer function
%0602	REPeat loop name
%0702	FOR loop counter (floating point)
%0800	machine code procedure
%0900	machine code function

word	pointer to entry in name list (or -1 if expression)
long	pointer to value (For variables this is an offset into the variable area, or if undefined, a negative number). For SuperBASIC procedures and functions, the high word is the line number of the DEF statement. For machine code functions and definitions, the long word is the absolute address of the routine.

TABLE 2 -- Floating Point functions

OPCODE	*NAME*	*FUNCTION*
%02	RI.NINT	INT floating point into word integer
%04	RI.INT	truncate floating point into word integer
%06	RI.NLINT	INT floating point form into long integer
%08	RI.LINT	convert integer into floating point
%0A	RI.ADD	add TOS to NOS
%0C	RI.SUB	subract TOS from NOS
%0E	RI.MULT	multiply TOS by NOS
%10	RI.DIV	divide TOS into NOS
%12	RI.ABS	take absolute value
%14	RI.NEG	negate
%16	RI.DUP	duplicate
%18	RI.COS	cosine
%1A	RI.SIN	sine
%1C	RI.TAN	tangent
%1E	RI.COT	cotangent
%20	RI.ASIN	arcsine
%22	RI.ACOS	arcosine
%24	RI.ATAN	arctangent
%26	RI.ACOT	arcotangent
%28	RI.SQRT	square root
%2A	RI.LN	natural logs
%2C	RI.LOG10	base 10 logs
%2E	RI.EXP	exponential
%30	RI.POWFP	take NOS ^ TOS

TABLE 3 -- Graphic function parameters

SD.POINT	%00(A1)	y co-ord
	%06(A1)	x co-ord
SD.LINE	%00(A1)	y co-ord of end of line
	%06(A1)	x co-ord of end of line
	%0C(A1)	y co-ord of start of line
	%12(A1)	x co-ord of start of line
SD.ARC	%00(A1)	angle of the arc
	%06(A1)	y co-ord of end of arc
	%0C(A1)	x co-ord of end of arc
	%12(A1)	y co-ord of start of arc
	%18(A1)	x co-ord of start of arc
SD.ELIPSE	%00(A1)	angle of rotation
	%06(A1)	radius
	%0C(A1)	eccentricity (1 if a circle)
	%12(A1)	y co-ord of center
	%18(A1)	x co-ord of center
SD.SCALE	%00(A1)	x position of graphics origin
	%06(A1)	y poistion of graphics origin
	%0C(A1)	scale factor
SD.GCUR	%00(A1)	graphics x co-ord
	%06(A1)	graphics y co-ord
	%0C(A1)	horiz. pixel offset of cursor
	%12(A1)	vert. pixel offset of cursor

ARCHIVE MASTER

ARCHIVE Database is a powerful, flexible and unique program that was supplied as a "bonus" with most new QL computer systems. However, due to it's complexitity and lack of complete documentation, it is perhaps the most misunderstood QL program...that is, up until now. Enter the new book, ARCHIVE MASTER, from Executive Workshop. ARCHIVE MASTER explores all of the inner workings of ARCHIVE, and contains tips & tricks to help you make ARCHIVE an even more powerful tool for personal use and business. Complete procedures are included to set up an Inventory program, a Customer/Supplier file, an Accounts Receivable/Invoicing program, a Mail List Manager, and much more! ARCHIVE MASTER is supplied with a durable three ring binder, and is priced at $44.95 (plus $3 S&H).

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Time Designs Tests

TAX-I-QL/87, PACIOLI and THE SPY

by Mike de Sosa

Sounds like a spy thriller, but the title really refers to an income tax preparation program (in the nick of time), a personal or small-business double-entry accounting system, and a revolutionary multi-taskable, multi-file, universal full-screen editor--all for the Sinclair QL.

*EMSOFT'S TAX-I-QL/87 * * * * 1/2*

TAX-I-QL/87 is a rather complex IRS Form 1040 template designed to simplify tax preparation by individuals or tax-form preparers. It replaces TAX-I-QL which had to be rewritten from scratch. It is used with either QLSS version 2.1 or ABACUS version 2.3 and a QL with at least 256K RAM. Few instructions are on the template, and most instructions must be read from IRS forms, but this should remove a little drudgery from the process, satisfy your soul, and leave you a good record with which to impress your IRS tax auditor.

The disk version can print to IRS forms but the Microdrive version will not.

Since you probably won't read this before 30 March, I have tried to arrange an expeditious way to order the software. TAX-I-QL/87 is deductible at $24.95. Send your check to EMSOFT, P.O. Box 8763, Boston, MA 02114-8763. Specify the Microdrive or 5 1/4" disk version, and, if the latter, whether double- or quad-density. EMSOFT will expedite shipment. No telehone orders.

*A.R.K. Distributions THE SPY * * * * **

A.R.K.'s *THE SPY* is from Richard Howe and those wonderful folks who gave us *ARCHIVIST*. *THE SPY* is billed as a multi-file, multitaskable, universal full-screen editor. Not a word processor, the program "is designed primarily for programmers who want an editor which EXECs quickly, multi-tasks, and takes as little space as possible [in RAM] while providing all the fundamental editimg facilities at the highest speed."

THE SPY lives up to this billing and more. A.R.K., for Applied Research Kernel, Distribution is in the business of designing and retailing <u>business</u> software, and their latest product is another good piece of work. 500K of assembler source language have been compiled onto about 200 Microdrive sectors. The people at A.R.K. believe that in the future most small computer sustems will be emulated faster on Transputer* based home micros, and, if so, computer owners may be freed from the whims and follies of computer companies.

What can *THE SPY* do? It can load and stack as many files (programs) as your QL RAM permits, allocate working space to each, and tansfer blocks of code (from assembler language to SuperBASIC) locally within files or globally between files. Files can be of any type from binary to text. It commands functions using a single keypress or combination keypress, that is, CTRL B to drop the BLOCK menu or CTRL Z to zap the current file from the stack. Other commands are via the function keys. Extremely rapid operation is possible, shifting between screens of code and moving or correcting blocks of code semi-automatically. *THE SPY* can, for example, load itself, customize itself, and then replace itself--something like a Phoenix.

THE SPY is said to be compatible with QRAM, KEYDEFINE, and probably with other master multitasking programs. (The software arrived too late to test its operation with other such programs and its price was not mentioned, but Mark at SHARP's should have the "straight skinny" on price and compatibility by the time you read this.)

* <u>Transputer</u>. A firmware/hardware addition for microcomputers that will vastly increase their speed of operation and versatility so that computers like the QL might become virtually obsolescence proof. Leon Heller, editor of QUANTA, has been working on this revolutionary development for some time.

*ZEATALINE's PACIOLI * * * * 1/2*

PACIOLI is a double-entry book-keeping system designed to enable the individual or small-business man to manage his own finances in a comprehensive way with a minimum of effort. *PACIOLI* is menu-driven and straightforward to use, and learning to use *PACIOLI* is a liberal education in double-entry accounts-keeping. The program also computes several financial ratios such as net profit percentage, capital circulation, and annual growth rate. Screen and printout representations of bar- and pie-graphs are available. The significance of the name *PACIOLI* escapes me. Distributors should check with me for U.S.A. wholesale prices. Individuals should check with their distributor or write to Zeataline Projects Ltd., 3 York Close, Washingborough, LINCOLN, LN4, 1SQ. Looks like a winner! About $30.

NEXT TIME: Full information on lots of exotic new software that is supposed to be on the way.

Why the QL?

Now is not the time to give up on the Sinclair QL!

by Mike de Sosa

A number of people have said that the Sinclair QL is dead--that there is no point in upgrading to the QL or in sticking with it any longer! These nay-sayers cannot be more wrong. Following are just some of the reasons why you should upgrade to the QL or stick with it:

1. The Sinclair QL package is, quite literally, the best value for money of any professional computer.

2. Other Sinclair computers "would not die," and the QL is no exception--it is still "state of the art."

3. Second- and third-generation QL software--far more affordable and in many cases better than most big name brands--is now available.

4. Many QL users who use big-name brand minicomputers and personal computers at work much prefer the QL for many reasons.

5. Low-cost and innovative QL firmware and hardware which fully utilizes the QL's great power is only just now approaching fully developed status.

6. The QL Users and Tinkerers Association (QUANTA) library now provides 20 quad-density floppy disks containing QL software and documentation of all types and descriptions at very low cost to members--contact Tom Bent between 7pm and 10 pm EST at (301) 738-7187 for further information on QUANTA, its excellent monthly newsletter, its massive members' software library.

7. The T/S 2068 is an excellent computer which has given us great service, but it lacks the necessary capacity to run comprehensive database, spreadsheet, desktop-publishing, and integrated (multitasked) programs. The QL with TRUMP CARD uses 89% of RAM!

8. Most QL users are unaware of or do not make full use of the latest QL products which can transform operation of the QL to such an extent that it should be the computer of choice for many at a small fraction of the cost of many less capable systems!

To take fuller advantage of your QL, subscribe to TIME DESIGNS Magazine ($16.95 a year for six big issues) and purchase Dr. Mike de Sosa's excellent book, TAKING THE QUANTUM LEAP, the most up-to-date book on QL, written in language anyone can understand, which explains many useful things about the QL just not found in its user guide. Both are available from TIME DESIGNS, 29722 Hult Rd., Colton, Oregon; tel. (503) 824-2658; CompuServe ID# 71350,3230. Order both Now!

Buy a QL or two or three of them from your favorite QL dealer while they last!

Prepared using PAGE DESIGNER 2--looks like the Macintosh!

Why the QL?

Now is not the time to give up on the Sinclair QL!

by Mike de Sosa

About four years ago I wrote an article for Reader's Digest (never published) about the new Sinclair QL microcomputer. I entitled the article "The First Lightweight, Low-cost Supermicrocomputer," and promised that the QL would soon revolutionize the computer world, including the training of computer users, financing, and logistics. And the QL promised to do just that, but a few things went wrong: early models of the QL and early versions of its bundled software were just not ready for release, resulting in some bad reviews; Sir Clive's marketing strategy left many things to be desired; the U.S. distributor, though personally helpful to me, was poorly organized and refused to advertise--the statement was made, "We don't need the U.S. market"; the Reagan administration held up FCC clearance for seven months--crucial at the time; computer sales went flat; Sir Clive almost went broke because of his electric tricycle and had to liquidate his QL brainchild; etc.

The Sinclair QL and its bundled software, is now "fully developed" through the efforts of Psion Ltd. and third-party firmware designers, notably Tony Tebby, and its price has dropped from $500 to under $100.

The QL remains the first lightweight, low-cost, supermicrocomputer. Many computer experts--regular users of Apple, IBM, Texas Instrument, and other PCs--have visited me and marvelled at what an intelligently augmented QL can do. (They even like the keyboard and Microdrives--unique to Sinclair--which many have previously knocked.) When I tell them what the computer and its allied software, firmware, and hardware cost, their jaws really drop! For many of the same reasons that the QL was to have revolutionized the computer world in 1984, it remains an extremely versatile, almost obsolescence-proof computer (remember the term transputer--a new device which will, among many other things, permit the emulation (and input/output to) any type of computer, permitting the true universalization of computers--it's coming soon for the QL.)

What I'm trying to say is that the QL is an excellent machine that, when properly upgraded, will allow you to join the computer revolution and remain "state of the art" for the foreseeable future--and this at the very lowest cost!

Many other reasons for sticking with or upgrading to the QL are listed on the facing page, and I could go on listing them all day, mainly in connection with the many outstanding classic and new software programs now available. Did you hear that Psion Ltd's QL CHESS, running on the QL, won the World Microcomputer Chess Championship for the third time?

LOW-COST JS ROM NOW AVAILABLE

One problem with U.S. QL's is that they are furnished with JSU ROM chips rather than JS ROM chips. The former cause certain graphic distortions/relocations with some software, for example GRAPHIQL+, VROOM!, PROJECT PLANNER, DECISION MAKER, etc., thus limiting their use. Replacement JS ROM chips are now available for about $25, and for about $35 you can have the JS ROM plus built-in TOOLKIT II, or ICE, or QfLash RAMDISK & TOOLKIT (no, you must furnish these chips) on EPROM. For another $10, RMG Enterprises, tel. (503) 765-2455, will even install it in your QL or a new QL, but I understand that this is a snap, requiring less than ten minutes work and no soldering. Have it put in a new QL, and buy yourself a spare QL--with JS ROM--today, the price may never be lower. Check with your favorite QL distributor for exact prices, etc.

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PAGE DESIGNER 2

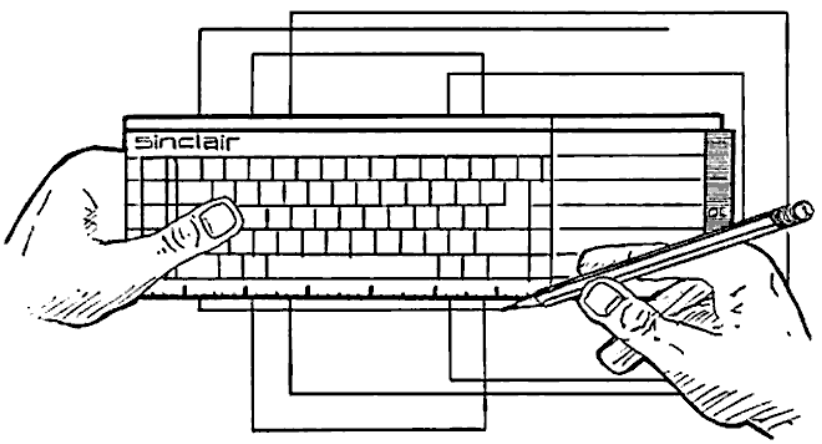
PAGE DESIGNER 2 is a radically changed and greatly enhanced commercial version of the QUANTA library's original PAGE DESIGNER (see Time Designs, Jan/Feb 1988, p. 38). PD2 requires at least 256K of additional RAM (and more is better), and its products are not compatible with the original program.

Like its predecessor, PD2 is simple to understand and easy to use. New features include the ability to store more fonts in memory, to store as many as nine (small) pages, to import QUILL _doc files into multiple automatic or manually defined columns, new column justification options, word or character microspacing by pixel, new text and hires fonts, multi-pass printing and multiple copy options, improved text typing, and many others. CUT & PASTE operations are very fast and versatile. PD2 is available from SHARP's for under $60.

NEXT TIME: "Upgrading Your QL," more HOT TIPS, and more exotic wares for your QL.

DESIGNING WINDOWS

a QL program by P. Bingham



No QL graphics discussion would be complete without mention of the QL's marvelous windowing abilities. With the power allowed by virtue of Super-BASIC, the QL can handle many windows, treating each almost as separate screens. With all the window-specific commands available to the programmer, he (or she) can have control only dreamed of in other Sinclair machines.

But during programming, the actual DESIGNING of a window usually goes something like this: 1) type in WINDOW command with the four parameters set; 2) realize it isn't long enough on the screen; 3)type in another WINDOW command; 4) now it is way too long; 5) type in another WINDOW command with an in-between parameter...now what was the original value? 6) start throwing things.

A couple of years ago, I ran across a little program written by James Lucy in the British publication, QL WORLD. QL WORLD is great for QL lovers and is still worth the rather steep "poor-exchange-rate-induced" price of four bucks an issue from the few U.S. dealers who stock it. James Lucy's program was a quick little window editor for monitor owners. I have modified it quite a bit from the original (Listing 1).

The program is simple. Just type it in as is and run it. It will draw the outlines of a window. Then by using the arrow keys, this window frame can be moved around the screen. (If you bump into the screen edge it won't go any further.) By holding the CONTROL key down, the arrow keys will cause the box to shrink or swell to the desired size. The program moves the frame in steps of seven, but for fine tuning, just hit F1 and you may proceed a pixel at a time. To set it back to seven just hit F3. When you have what you want, hit the TABULATE key and the exact WINDOW parameters will be printed for you in the center of the screen. You may keep drawing various sized window frames over each other, or just hit ESC and the screen will clear ready to go again. The program alters each subsequent frame color so you can distinguish each more easily. Once in a while, two overlapping lines cancel each other. Not to worry, just hit an arrow key or TABULATE.

Well, fire up those QLs and start some fancy window programming again now that you have no excuses! This program will help with header blocks and thin shadow line parameters as well, so go do something to make that black and white MACINTOSH screen next door turn green with envy and your cousin's BIG BLUE turn even bluer.

LISTING 1

```
10  REMark DESIGNING WINDOWS
20  :
30  MODE 512:WINDOW 512,256,0,0:PAPER 4:OVER-1:CLS:i=3:o=7
40  REPeat new_window
50  x=440:y=210:p=30:q=20:windows
60  REPeat outline
70  z=CODE(INKEY$(-1))
80  windows
90  SELect ON z
100 =240:o=7
110 =232:o=1
120 =208:q=q-o:IF q<0:q=0
130 =216:q=q+o:IF q+y>256:q=q-o
140 =192:p=p-o:IF p<0:p=0
150 =200:p=p+o:IF p+x>512:p=p-o
160 =218:q=q+o:y=y-o:IF y<2:q=q-o:y=y+o
170 =210:q=q-o:y=y+o:IF q<0:q=q+o:y=y-o
180 =202:p=p+o:x=x-o:IF x<2:p=p-o:x=x+o
190 =194:p=p-o:x=x+o:IF p<0:p=p+o:x=x-o
200 =27:RUN
210 =9:windows
220 WINDOW 95,10,200,125:INK 7:CLS:PRINT x!y!p!q!
230 WINDOW 512,256,0,0:o=7:i=i+2:IF i=9:i=3
240 NEXT new_window
250 END SELect
260 windows
270 END REPeat outline
280 DEFine PROCedure windows
290 BLOCK x,1,p,q,i:BLOCK x,1,p,q+y-1,i
300 BLOCK 1,y-2,p,q+1,i:BLOCK 1,y-2,p+x-1,q+1,i
310 END DEFine windows
```

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WANTED: MIDI SOFTWARE for composing, editing, playing and printing on the Sinclair QL. Reginald Cottle, 840 Eglinton Ave. West, Toronto, Ontario, Canada, M5N-1G1. (416) 785-3987.

FOR SALE: PORTUGESE TIMEX 2068 computer, very rare U.S. Model, 2040 printer, 2020 recorder, ZX81, programs, more. Send for list. Dave Maccarone, 67 Bradley Ct., Fall River, MA 02720, (617) 678-2110.

FOR SALE: BYTE BACK PARALLEL I/F for the TS2068. $60 ppd. Ted Dupar, 21696 Cabrosa, Mission Viejo, CA 92691, (714) 583-9763.

FOR SALE: BYTE BACK RS-232 with documentation. New, never used, just sat in drawer. New was $70. Yours for just $35. David Hartman, 2 Gillis Road, Portsmouth, VA 23702.

FOR SALE: TS2068 w/modified keybd, including monitor, 2 print I/F's & Disk I/F. Lots of books & software. $150. Loren Latker, 10634 Valparaiso #32, Los Angeles, CA 90034, (213) 558-1127.

WANTED: BACK ISSUES OF T/S MAGS. (QZX, SYNTAX, TDM, SUM, SINCUS, T/S USER, etc.) Also: schematic, Owner Manual for TS1500. Send list/prices to: D. Smith, R.415 Stone St., Johnstown, PA 15906.

WANTED: TS2068 EXTENSION CABLE for peripherals (rear dock connection) or information as to where the parts for same can be obtained. John Deering, 136 Neverbreak Dr., Hendersonville, TN 37075.

WANTED: A ROMPACK EPROM with both ZX Pro/File and Quickload on the same cart. Warren Jackson, 11141 Edgemere Terrace, Roscoe, IL 61073. After 5 CST, (815) 623-6937.

FOR SALE: 3 WESTRIDGE MODEM BOARDS, untested, with schematics...$30. Can be used for RS-232 Interface project in Vol.2 No.3 of TDM. Bill Ferrebee, 749 Hill St. #6, Parkersburg, WV 26104.

WANTED: QUADRA CHART and PC-DRAW software for TS2068. FOR SALE: I/F hardware/software for 2068 4-color plotting w/Commodore 1520. John McMichael, 1710 Palmer Dr., Laramie, WY 82070.

SINCUS NEWS-$8/6 issues a year, 2068 oriented, subscriber active news, tips, swaps, how to's, send a check to SINCUS NEWS, 1229 Rhodes Rd, Johnson City, NY 13790. A non profit hobby group since 1982.

FOR SALE: 1 TS1000 w/16K & SW, w/monitor kit, 1 TS2068 used, & 1 TS2068 new, 1 TS2040 and also 1 TS2050 modem. Also have new SW in box's, will sell or trade (for list, send S.A.S.E.) R Burt, PO Box 157, Belleville, Ontario, Canada K8N-4Z5.

WANTED: COPIES OF THE FOLLOWING articles from SINCUS on "Comput Interruptus"...Part 1 to 5 (May 5 to Feb 86). Renato Zannese, 615 Roding Street, Downsview, Ontar Canada, M3M-2A6.

WANTED: INTERFACE ONE with manu For ZX SPECTRUM 48K. Call or wr John A. Byrne, Rt.3 box 342, Cr ville, TN 38501, (615) 526-791

WANTED: HOT-Z II with docs; original TS1500 Owner Manual; 2068 with docs (good condition used Byte Back MD2 modem (ZX). G. Tripptree, 180 Summit Circl Little Ferry, NJ 07643.

FOR SALE: TAX-I-QL/87 template 1987 taxes on a 256K QL. Info or $24.95 from EMSOFT, Box 876 Boston, MA 02114.

NEED HELP: Converting the grap section of the TS1000 program "Stock Market Tech Analysis I" (Timex), over to the TS2068. Dal Weiler, 4641 Kawanee Ave, Metair LA 70006.

FOR SALE: ZEBRA 3-PIECE FDD DI DRIVE SYSTEM for the TS2068. $0. Larry Kenny, RR#2 Navan, Ontar Canada K4B-1H9, (613) 835-2680

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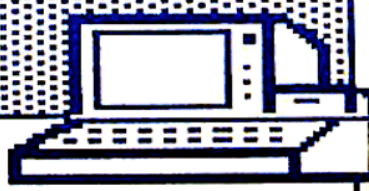

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